COMPUTERWORLD

Special Editorial Supplement September 29, 1997

100 Hot Emerging Companies

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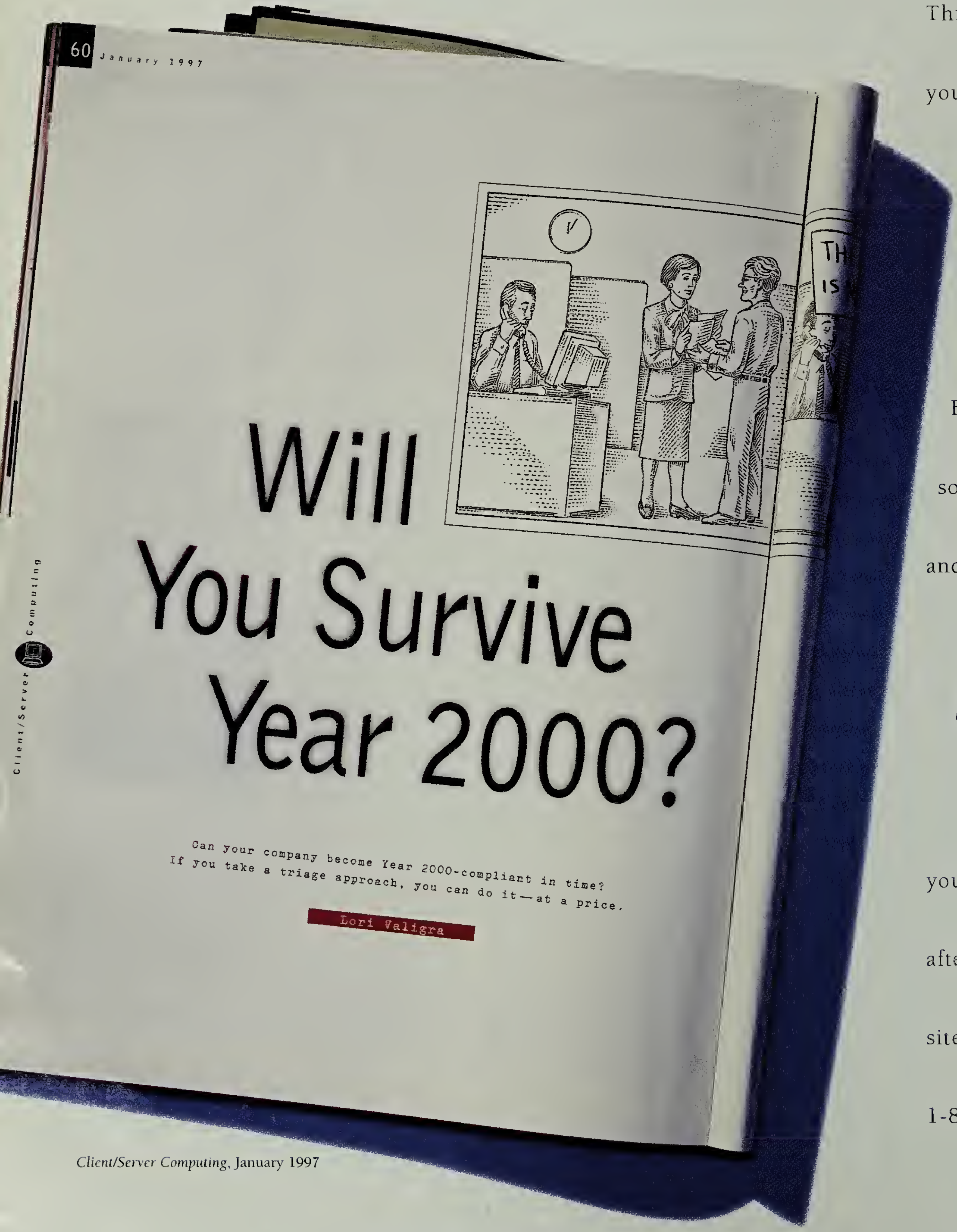
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Client/Server Computing

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Lori Valigra

Client/Server Computing, January 1997

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EDITOR'S NOTE

Wheat from chaff

Cutting through the hype that enshrouds many IT industry start-ups is like trying to see through the dark: the farther and deeper you go, the scarier it gets. It's an imposing task separating worthy start-ups from also-rans, since for every credible high-flying entrepreneur there's a shameless self-promoter who makes P.T. Barnum look like a fanatic Hyde Park crier.

Why is it so tough? Plentiful venture capital: It's raining green for almost anyone with a reasonable concept, track record and business plan. Everyone's trying to cash in on the Internet — and beyond! And many start-ups want you to believe they're the next Intel, Microsoft, Netscape or Cisco — or just a notch below.

It's in the spirit of exploration and demystification that *Computerworld* unfurls this supplement before you. Our premise: Given technology's warp-speed gyrations, you can use some help evaluating the many emerging outfits seeking to be your "strategic partner."

We started our "Hot Emerging Companies" pursuit by surveying 600 IS managers and 70 consultants and venture capitalists about start-ups they felt could make a meaningful contribution to the industry. Our criteria: The companies had to have started up after Jan. 1, 1990, had to have less than $100 million in sales, and had to be for-profit ventures.

We took their recommendations and surveyed more than 350 start-ups. We collected a wide variety of data during the past six months on their capitalization and sources of financing, revenue and profit growth, product lines, major customer references and executive teams. A team of CW editors and researchers continuously cross-checked and updated the data to make sure the nominated companies met our criteria.

A panel of experts — Howard Anderson, president of the Yankee Group in Boston, Roger McNamee of Integral Capital Partners in Palo Alto, Calif., and Steve Woit of IDG Ventures (a sister company to Computerworld) in Framingham, Mass. — then helped distill our list to 100 of the hottest emerging companies we could substantiate. They judged the nominees on their technological innovation and potential to either solve IS problems or help generate business value for their customers.

Our list is highly focused on networking start-ups, with an obvious predilection toward the Internet. What else would you expect: The network has finally become the computer! Sure, there are some fashionable names on the list, and others you probably haven't heard of. But all in all, we think this supplement can be a starting point for identifying those start-ups with a fighting chance to help your organization achieve its business and technological goals.

Alan Alper

alan_alper@cw.com

HOT EMERGING COMPANIES STAFF
Editor: Alan Alper; Managing Editor: Anne McCrory; Art Director: Dan Beard; Research Director: Bob Fink; Researcher: Mari Keefe; Research Intern: Joseph Rigoli; Copy Editor: Patricia Erickson

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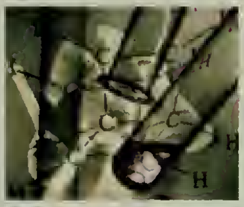

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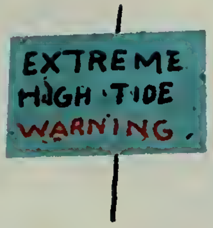

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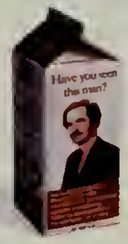
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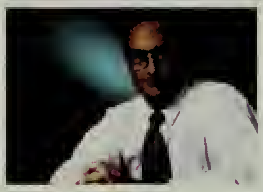

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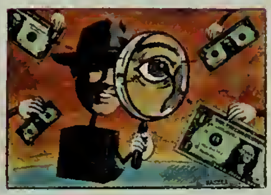

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By Alice LaPlante

Surprise, surprise. Technology is not the No. 1 factor in determining whether a high-tech start-up will break away from the pack

Photographic illustration by Ralph Mercer

Formula for success: Equal parts pain, vision, money, luck and timing

"Man is most uniquely human," wrote the American philosopher Eric Hoffer, "when he turns obstacles into opportunities."

That pretty much sums up the key ingredient for determining if a high-tech start-up has a fighting chance. Not whether an established entrepreneur has a stunningly brilliant idea. Not whether the best and brightest whiz kids from Stanford or MIT are on the founding team. Not whether the company has deep-pocket funding available from the hottest venture capital team. And certainly not whether a cool — or even *the* coolest — technology is ready to ship.

No, the No. 1 determinant of whether a particular company is going to make it is whether people — somewhere — are in pain.

That is, whether there's a serious problem disrupting the lives of potential customers.

"People will *not* beat a path to your door just because you have a great product," warns David Cearley, vice president and service director for Workgroup Computing Strategies Service at Meta Group, Inc. in Stamford, Conn.

But if a new enterprise offers a cost-effective antidote for that pain, then, maybe, there's a chance of success.

Of course, a number of other ingredients for success emerged when we talked to the men and women actually out on the firing line. Like vision. Passion. Marketing savvy. Good old-fashioned luck. And yes, naturally, competent technology.

Read on, and see for yourself.

1. A whole lotta pain.

This is completely nonnegotiable: There must be a big — and as-yet unsolved — problem out in the world.

"The trick is to successfully identify a problem that is costing people unacceptable time and money and aggravation," says Richard Schwartz, chairman and chief technology officer of Diffusion, Inc., the Mountain View, Calif.-based maker of IntraExpress, an Internet-based "push" product. "Then, when you show them your solution, they will immediately — and urgently — demand to buy it."

2. Timing, timing, timing.

It's really quite simple. You can't be a moment too early introducing your product or service. Or a millisecond too late.

If you're too early, you end up doing

what Shikhar Ghosh calls "missionary work." "People must already be talking about the problem, must already agree that something needs to be done," says Ghosh, CEO and president of Open Market, Inc., a maker of Internet transaction management and access-control software based in Cambridge, Mass.

"Timing sinks a lot of companies," concurs Schwartz, who held off building a Java-dependent product for this reason. "Someone might have a great idea. And there might be a genuine need for the product. But they can run out of money waiting for the market to catch up."

When Shlomo Kramer and Gil Shwed — who met while serving in the Israeli Army — came up with the concept in 1992 that eventually turned into Check Point Software Technologies Ltd., an Israel-based manufacturer of network security products, they ended up shelving the idea for a full six months. A dangerous thing to do in the fast-moving world of high-tech start-ups? Not at all. In fact, it was the *only* thing to do, according to Kramer, now executive vice president of the firm, which today commands a 44% share of the global firewall market, according to The Yankee Group.

"We knew it was an interesting idea, that we had identified a real need and had a unique approach, but we also knew that the market wasn't quite there yet," Kramer says. If a small company comes out with a product even slightly early, he says, it runs the very real risk of depleting its funds while waiting for the world to catch up. "There's also the human side," he points out. "A start-up is a very demanding environment, and although living through the 'anticipation' phase is doable for a year or two, if it takes longer than that, your team might not endure."

3. Unyielding vision, endless flexibility.

When Michael J. Lyons was building his first high-tech start-up in 1977, at the age of 26, he was told by experts at IBM and Digital Equipment Corp. that what he wanted to do — design a Cobol engine to restructure aging corporate applications —was impossible.

"Fortunately, I was too stupid and too young to listen," says Lyons, who just launched his fifth start-up: Arriba Tech, an Emeryville, Calif.-based Internet content management services firm. And that, he says, is the point. "You must have a vision that isn't swayed by anybody," he says.

Check Point Software's Kramer recalls that perhaps 80% of the people he talked to about his concept for a shrink-wrapped network security product tried to convince him it wouldn't fly. "You must believe in your vision," he says. "Listen to everyone, and take advice from everyone, but at the end of the day, it must be your decision and no one else's."

And with this type of vision comes the ability to say "no."

Bob Davis, president and CEO of Lycos, Inc., in Framingham, Mass., an online "orientation point" that provides news, views, reviews and a search engine to help people navigate the World Wide Web, points out that the heads of successful start-ups will inevitably be faced with the fact that "there's too much opportunity out there." Lycos, for example, boasted 200,000 daily visitors in 1995. Today, more than 7 million Web browsers visit its site each day. "Dozens of companies come to us, looking to leverage this traffic. We have to be very focused."

Davis believes that allowing growth to get ahead of available resources could spell disaster. "If you don't have the people and the infrastructure to deliver, you run into trouble," he says. (See story, at right.)

Other entrepreneurs agree, but they caution that unyielding vision must be coupled with the willingness to be extraordinarily flexible.

John Butler is president and CEO of Network Integrity, Inc., a Marlboro, Mass.-based maker of network recovery systems. When he was working with his three partners in 1992 to develop a business plan centered on data protection for corporate networked computing environments — which they thought held tremendous revenue potential — they rejected a number of initial ideas as "nonunique." "At first, we considered some fairly conventional concepts for backup storage," he recalls. "Most of them did not demonstrate sufficient novelty. Although we could see flaws in the current products, there was no fundamental advantage to entering the market."

Yet sticking to the notion that corporations dependent on networked computing would need to guarantee the integrity and availability of network data, Butler and his partners kept running ideas past potential customers and venture capitalists until they came up with the design for what turned into their flagship product, LANtegrity.

4. Enough money — from the right people.

Then there's the money thing. Most founders of high-tech companies recommend having enough venture funding to continue operations for six months to a year.

"Give yourself a chance," says Jim Dorian, chairman and founder of Arbor Software Corp., in Sunnyvale, Calif., maker of Essbase, online analytical processing server software. "It's very time-consuming to have to keep looking for money. You will want to put your efforts elsewhere. So make sure you have a financial lifeline."

But the source of the money is also key. Having venture partners who support the founders' vision and who will work in harmony with the management team is absolutely critical. (See related stories, pages 6 and 14.)

5. Lady Luck.

Zack Rinat, president and CEO of NetDynamics, Inc. in Menlo Park, Calif., which markets Internet-based products for delivering networked applications, met his business partner because their children attend the same private school. Arriba's Lyons bumped into his first business partner in a technical headhunter's office.

Who says luck has nothing to do with it?

"Software is the toughest Pac-Man game in the world," Lyons says. "You can have the product marketing, the product positioning, the finances — and yet the whole thing dies. No matter how smart and how prepared and how experienced you are, you won't get anywhere without a little luck."

Alice LaPlante is a freelance writer based in Woodside, Calif.

The rise and fall of Avalon Software

Photo: David Zickl

Kim Sheridan

In 1992, Tucson, Ariz.-based Avalon Software, Inc. was looking good.

Founded in 1973 by engineer Kim Sheridan, the firm developed integrated business software for midsize manufacturers. By the early 1990s, it was widely perceived as a rising star in the enterprise resource planning (ERP) software market.

Ahead of its time in catching the client/server wave, Avalon saw its sales swell to more than $21 million in 1994. The company garnered rave reviews from analysts for technological innovations well in advance of industry giants such as SAP AG and The Baan Co. By January 1995, Avalon was the world's fifth-largest manufacturer of ERP software. Riding high, Avalon estimated that fiscal 1995 sales would exceed $45 million.

Then came the fall.

Although 1995 revenues yielded a respectable $33 million, the company was late shipping the latest release of its flagship product. It also made what many observers believed was a fatal decision to continue developing for the Sybase platform and failed to meet commitments to major customers. By early 1996, the firm had lost key marketing and sales executives and had begun running short of funds. Even after raising $15 million in additional venture capital, Avalon struggled to maintain viable cash flow and filed for bankruptcy on July 3, 1996. In September 1996, IFS Industrial and Financial Systems, Inc., an international ERP software supplier, purchased Avalon's assets for less than $3 million.

What went wrong? Analysts say Avalon demonstrates how it's not enough to be the first — or even the best — company to hit a market with a particular "gotta-have-it" product. "Avalon had all the makings of a success," says Jim Shepherd, director of research at Boston-based Advanced Manufacturing Research, Inc. "They certainly had the right product at the right time." The only problem was that Avalon was making the sort of commitments that even a much larger and better-funded company would have had trouble meeting.

"You have to remember, they were still just this little Tucson firm," Shepherd says. "But they got seduced by success." When global players such as SAP and Baan released comparable products, "Avalon's competitive advantage dried up."

Avalon's founder agrees. "We basically outgrew our capability to deliver," Sheridan recalls. His advice to would-be high-tech entrepreneurs: "Don't sign contracts which say you'll deliver technology or functionality that doesn't yet exist."

Despite the painful process of burying his company, Sheridan says, "Yes. Oh sure," when asked if he would ever join another start-up. "There's such tremendous opportunity out there, what with the Internet and World Wide Web," he says. "It's a very exciting time. Who wouldn't want to be a part of it?"

— *Alice LaPlante*

Truth or Consequences

Working with start-ups can be risky business — but there are ways to protect yourself

By Linda Wilson

Chip Perry, director of information strategies for The Pillsbury Co. in Minneapolis, has had ample opportunity to work with new vendors. Lately, he's been involved with vendors that build World Wide Web sites. And he's had more than his share of trouble.

So far, one of his "partners" has gone out of business; the other is too busy to support the application it built.

In the world of the Web, "nobody's expertise really spans more than 2½ or 3 years," Perry says. "There is no safe haven."

Sound familiar? Probably, if you've been in a position to work with new, unproved technologies, which by their very nature are often available only through new companies.

There's good reason to fret. New companies can go out of business or grow so fast they can't keep up with demands for technical support. The products they tout may be filled with glitches, may not work at all or may crash your entire system. Or, it may take the firms so long to get their products into production that you lose the competitive advantage you'd gambled on getting.

It's a high-risk game, to be sure, and users' experiences range from good to awful. Nonetheless, there are measures you can take to minimize your risk.

One strategy, of course, is to nail down favorable language in your vendor contract (see story, page 5).

Another is to create a thumbnail sketch of the company and its prospects for success. Ask if its founders have a good track record in technology or in founding other companies. Do they have big-name vendors as beta customers or development partners? What about marketing or distribution relationships with well-known vendors? And adequate financing from respected venture capital firms?

Then there are softer considerations: What does your gut tell you? Do you trust them? Do they come recommended by people you trust?

Knowing who you're dealing with helps

James Marek, vice president of retail banking at The City National Bank of Taylor (Texas), took a risk on Edify Corp. in Santa Clara, Calif., because he knew and trusted a senior sales engineer, Eric Tamblyn in Plano, Texas, from a former business relationship.

Though Edify, founded in 1990, wasn't brand new, Marek considered the company young enough to be risky, especially since he would be one of its first major customers. When City National purchased Version 4.0 of the Electronic Workforce, a tool for building interactive self-service applications, in December 1995, it became the first retail banking customer to do so.

Illustration by Robin Jareaux

City National wanted the product to build two related applications. One gives customers real-time access to account information via the Web; the other gives access to account information via an interactive voice-response system.

"We had to take a risk on somebody because of the newness of the [Web] product," Marek says.

Marek and Tamblyn met in 1994. Marek was having trouble with a system no longer under warranty from Syntellect, Inc. in Atlanta, a vendor of interactive voice response systems. Tamblyn, who worked at Syntellect, helped Marek fix the system on weekends as an independent contractor, with the blessing of his employer.

When Tamblyn joined Edify, he introduced Marek to Electronic Workforce. Marek says his company has been pleased with Edify's implementation, product and ongoing customer support.

Voyager on the Web: TravelNet dives in

Like Marek, Ken Leung, vice president of engineering at TravelNet in Santa Clara, Calif., chose a new Web product from a young vendor.

Leung is using Hahtsite from Haht Software, Inc. in Raleigh, N.C., to build a Web version of TravelNet's corporate travel planning and booking system, called Voyager. The Web version now has numerous pilot customers, and Haht planned to release the software late in the summer.

In deciding whether to go with Hahtsite, Leung considered the backgrounds of the company founders and company funding sources.

"I wasn't too concerned about the company going out of business, because they shared one of the same venture partners [Menlo Ventures] we had," Leung says.

The track record of Haht's founders also comforted Leung. All had experience in technology, and two of the four founders — Richard Holcomb and Rowland Archer — also had founded Q & E Software. A vendor of database access software, Q & E was sold to Intersolv, Inc. in 1994.

But what clinched Leung's decision to buy Hahtsite was his gut feeling about the company. "The president of the company [Jim Hebert] came and did a sales presentation. That told me they really wanted our business," Leung says.

He hasn't been disappointed. In the beginning, Haht sent one of its key people to TravelNet for three days, not only to explain Hahtsite to Leung's team but also to make recommendations about how to use it to build a Web version of Voyager. Since then, Leung says, Haht has worked diligently to remove bugs from its product.

"It is really about people, and they had a willingness to work together and grow as two companies," Leung says.

Trading experience for attentiveness

Roger Crowe, president, CEO and cofounder of Edify, said companies in their infancy can't offer their customers stability or certainty. Instead, they offer the hard work and attentive customer service that Leung experienced.

When Edify was new, "we tried everything we could to service [the customers] as well as we could — and not only with our services organization but with our best software engineers," Crowe recalls.

But sometimes, the relationship between an emerging company and an early customer just doesn't work — no matter how hard everybody involved tries. That's been Pillsbury's experience, though Perry declined to elaborate on the projects or to name the vendors or systems integrators involved.

In the first case, where the vendor went out of business after six weeks on the job, Perry was able to turn the job over to another systems integrator. "We took what little code was usable and threw it over to another vendor, who got [the Web site] up and running on time," he says.

In the second case, the work was completed, but customer support is so-so. "They are growing so fast that they can't support us," Perry says.

Setting up a beneficial relationship with a new vendor isn't easy. It's also not a strategy suited to every business problem or every IT manager. As Crowe recalls, "There was a self-selection process among the customers who would even talk to vendors who were brand new. [The customers] had to have a burning need to get a business problem solved and didn't see any other way to get the need solved in a short time frame.

"They also had to be risk takers," he says.

Linda Wilson is a freelance writer based in Glen Ellyn, Ill.

Protect yourself in legal terms

If you're thinking about doing business with a new company offering a new technology, it's important to protect your interests in a legal contract, says Los Angeles attorney James Kalyvas.

"Being on the bleeding edge of technology is a very high-risk game," says Kalyvas, who specializes in contracts with information-system vendors for the law firm of Foley Lardner Weissburg & Aronson. "There is no other area where the 'buyer beware' applies more than in information technology."

Kalyvas suggests that any contract you sign include language that provides:

1 An Insurance Policy

Name your company in the vendor's "errors and omissions" insurance policy, although you'll most likely have to pay for your coverage. Errors and omissions insurance is a policy that software vendors purchase to protect themselves against mistakes they make in the course of doing business.

2 Damages Coverage

Compensates you for what are known as "consequential damages," which are losses that flow from a product's failure but are not directly related to it. Examples of consequential damages include lost customer orders or downtime. "Assuming this product is going to interface with other products, I'd want to make sure that if my whole system goes down, there is someone I can look to — other than me — to pay for it."

3 Cost Limits

Caps fees for implementation costs. "If this is the first time they are going to do this, it is going to take them [the vendor] a long time, and it is going to cost them a lot."

4 Escrow

Gives you the right to source code if the vendor goes out of business or is unable to provide you with adequate customer support. Most often, source code is placed in escrow.

5 A Training Schedule

Promises enough training to turn one of your people into an expert. "You want to get one of your people tuned in to the inner workings of the system, which is unusual because it would entail the disclosure of some confidential information," says Kalyvas, adding that you also could offer to sign a confidentiality agreement.

6 A Billing Schedule

Outlines a payment schedule tied to levels of acceptance testing that are based on criteria you define. For example, Kalyvas suggests three levels: The product works, it works with other software you already own and it works in a production environment.

— Linda Wilson

Surf's up, and VCs are riding the wave

By William P. Densmore

A strong economy and rush of new technologies is creating a funding undertow

Venture capital, once considered a boutique source for companies with surefire products in a unique market, is becoming a standard financing option for most information-technology start-ups.

More than $10 billion was invested in 1,502 deals during 1996 — 60 percent of those in information-technology ventures, according to the annual report of the National Venture Capital Association (NVCA). That's up steadily from $3.4 billion invested in 823 deals in 1991 (see chart, page 7).

The reasons for the growth include a relentless, tide-like rush of new technology opportunities extended by the tsunami-like influence of the Internet. This is attracting more and more investment dollars into venture-capital funds. In turn, the rush of investment fuels more ideas and more companies.

Analysts, venture capitalists and entrepreneurs alike say the cycle of money fueling technology start-ups, producing returns and attracting more money shows no sign of abating during the 1990s, regardless of macro-economic factors. The result: Companies with the right mix of management talent, product, customers and vision say they have no problem getting money.

"A company with experienced management playing in a high-growth market that is demonstrating some major shifts and with a unique and proprietary technology and high barriers to entry — that's my definition of a quality company," says Prabhat K. Dubey, president and CEO of MMC Networks, Inc., a Sunnyvale, Calif., manufacturer of processor chips for Asynchronous Transfer Mode and Ethernet networking boxes. "And for a quality company, the atmosphere is that a lot of venture-capital groups chase them. We were bombarded."

The money reaches ventures through institutional, retirement or mutual funds, which, in turn, invest in venture-capital funds. And baby boomers are making direct investments — either as partners in a venture fund, as "angel" investors on their own or as an element in self-directed 401K or other retirement plans.

Overall, prefunding valuations of start-up-stage companies — those without a product on the market yet — by venture capital firms rose as much as 50 percent in 1996 from 1995, mostly because of Internet technology companies, the NVCA report says, reaching a median of approximately $3 million.

In one sense, it's a case of too much money chasing too few good deals, experts say. But in another, it shows investors now realize that information technology has become the engine driving economic productivity in a way that wasn't as evident in the 1980s.

"Because the last several years have been met with steady economic growth and relatively low interest rates, the amount of money in the hands of institutional investors, most specifically, mutual fund and pension fund managers, has just exploded," says Terrance C. Health, a research manager at VentureOne Corp. in San Francisco, which compiles the figures used by the NVCA

Illustration by James Yang

Riding the venture capital wave

Companies reaping benefits (all industries)

Year	Total number of deals*	Total $ invested
1996	1,502	$10 billion
1995	1,167	$ 8 billion
1994	1,036	$ 5.3 billion
1993	986	$ 4.9 billion
1992	952	$ 4.1 billion
1991	823	$ 3.4 billion
1990	NA	NA

* About 60% involved information technology companies in 1996, up from 41% to 47% in previous years.
Source: VentureOne Corp., San Francisco

and others. "There will continue to be a lot of money for start-ups to thrive on. But also a lot of money is going to be thrown at companies that probably shouldn't be funded."

A golden decade

By any measure, the 1990s have been a golden decade for technology venture investors and entrepreneurs alike.

"In the late '80s, it was very difficult to get funding for companies because there were not that many interesting new ideas," recalls David J. Orfao, president and CEO of Allaire Corp., in Cambridge, Mass., which markets Cold Fusion, server software that makes static Web sites more dynamic. Orfao is a veteran of three start-ups in 15 years. "With the paradigm shift to the Internet, I've found it to be very open to raising money," he adds. Allaire raised $5 million in second-round support from Polaris Venture Partners, BankBoston Ventures and USWest in about 60 days.

Emerging from the U.S. stock market mini-crash of 1987 and the collapse of real estate as a favored investment, venture capital funds first picked up steam as money started to flow into pension and mutual funds. Now, experts say, it is the tidal wave of new technology opportunities that is fueling the continued investment boom more than macro-economic factors, such as interest rates or employment statistics.

"We are in a climate now where the tide has been in for a long time and the question is if and when the tide will go out," says Stephen E. Coit, who recently left Charles River Ventures in Boston after a long career in venture capital. "We had some signs the tide would go out earlier this year, but frankly, now it looks like the waves are on the rocks again."

As long as new money flows in, more capital can flow out to start-ups. But if the investment money stops, according to Coit's tidal theory, venture capitalists will start to become impatient for their massive 1990s investments to return them liquidity. Others say this could put pressure on some venture-backed firms to sell their portfolio companies out to market competitors for cash.

"It's always cyclical. Anytime someone tells you a business is no longer cyclical, you should sell everything and hide," says William A. Sahlman, a professor at Harvard Business School, in Cambridge, Mass., who teaches venture finance.

Sahlman says he hasn't seen anything yet that points to a turn in venture investing, but he does believe some venture firms' returns are declining from the early '90s. "I think the moment the stock market has a real serious correction, where Intel or Microsoft doesn't do well, or when you get real intense pressure on profit margins, it dries up. But when it dries up, it sows the seeds for the next boom."

What technologies is this rush of capital funding? The favored investments shift from year to year, experts say. At the start of the decade, it was educational software, CD-ROM ventures and those in the tail-end of the computer hardware marketplace. Then came the client/server and networking infrastructure deals of the early 1990s — Cisco Systems, Inc., Shiva Corp. and others. Just as those were playing out, along came the Internet.

The Internet has fueled a new euphoria among investors and entrepreneurs alike. First, in 1994, came the Internet software makers, such as Netscape Communications Corp. Then, in 1995, came the access providers, such as Netcom On-Line Communications Services, Inc. and content aggregators such as the search engine Yahoo. In 1996, almost anything related to the Internet got serious attention, including so-called "push" technology.

Now, analysts and investors see a glut in the "push" marketplace. They are looking toward new revenue models and "tools" that make it easier to interact with customers and build corporate Web sites that link legacy systems seamlessly to the public network. Businesses based only on a concept, with no product and no customers, are now less likely to get funding than a year or two ago. But things are still not nearly as tight as the early 1990s, when all the fundamentals had to be in place.

Staffing tight

Investors, analysts and entrepreneurs predict no dramatic turnaround in the capital markets or the economy generally through the rest of the 1990s. Information technology investing will continue to rise overall, and money will flow naturally to the latest, most promising technologies, as it has throughout the 1990s, they say.

One caution: The intense pressure for skilled technologists and seasoned CEOs is making it hard for start-ups to put together teams that stay together, especially in the hot spots of California and Massachusetts.

"The giant sucking sound is created by the extreme demand for IT-capable people, and this has made it more critical from a recruiting point of view to finance new ventures with equity rather than debt," says Art Hutchinson, a senior consultant at Northeast Consulting Resources, Inc. in Boston.

The market for finding visionary CEOs has also never been tighter, Coit adds. "To found a company, you need a very accurate vision of what the market needs. It is what customers need tomorrow, not today. ... That is very, very hard to find right now."

Hot technologies

Start-up investment trends in the '90s

1990-1992: edu-tainment, CD-ROMS
1992-1993: client/server, network infrastructure
1993-1994: network infrastructure, early Internet
1994-1995: Internet access, content, search
1995-1996: Internet content, site management
1996-1997: intranet/extranet management tools, commerce

Source: *Computerworld* interviews with venture capitalists

Future winners

The rest of the 1990s are predicted to emerge as a period of even greater upheaval in the communications world, experts add, just as the 1980s were tumultuous for computer makers.

"People that are doing anything that is related to security on the 'net will get attention," says George M. Middlemas, managing general partner of Apex Investment Partners LLC, a major venture firm based in Chicago. "Plays that involve electronic commerce and, to some degree, network management software [will] too. I think there is going to be some interesting stuff going on in the router/gateway world."

The theme of the late '90s has been the insatiable demand for bandwidth and for mobility, adds Christopher Spray, a general partner with Atlas Venture in Boston. He calls the '90s the "golden age of information technology" (see related story, page 8).

"We have been looking aggressively at the mobile world, where the infrastructure still really isn't in place to allow high-speed data communication to take place," Spray says. "And I think in software there is a trend well under way of componentized software, and that leads to demand for integration services. I think security is important, but I don't think there is a lot of money to be made out of security. It will be built into the product, integrated much more."

Companies assisting with supply-chain management, data warehousing, online analytic processing and data mining will be favored in the months ahead, says M.R. Ragaswami, managing director of Sand Hill Group LLC, of Tucson, Ariz., which matches high net-worth individuals — "angel investors" — with firms seeking funds (see related story, page 14).

Ragaswami, whose career has included senior positions at Oracle Corp. and Baan Co., thinks the venture-capital funds will increasingly be competing with "angel" investors for investment opportunities. The "angel" can add relationships and partnerships and hands-on experience, he says, while the venture-capital community is more focused on structural and financial issues.

As long as investors perceive information technology as creating new markets and new opportunities at a rate unprecedented since the industrial revolution, new money will flow to venture capital and fuel the cycle. Only if reality proves different from perception will the tide ebb.

William P. Densmore is a freelance writer based in Williamstown, Mass.

What's Hot?

Anything connected with networking

By John Verity

Internet technologies, electronic commerce, enterprise networking and wireless communications lead the pack

Ask anyone in real estate what factors are the most important to consider when buying property, and they'll tell you, "Location, location, location." Likewise, the investment mantra in the information technology business these days is, "Internet, Internet, Internet."

And while anything related to the Internet (from electronic commerce to intranets) promises to be a hotbed of investment for some time to come, other related networking domains (TCP/IP in particular) are also bubbling with activity. Technologies, for instance, that add speed and capacity or provide remote access to enterprise backbones are brimming with investment action.

Surely you're not surprised that IP-based networking is ground zero for start-up activity? Megabucks have already flowed into 'net-related companies during the past few years, helping to contribute all that jargon and new brand names to everyday conversations: browser, cookie, Netscape, Yahoo.

Here's a look at four of the hottest areas of start-up opportunity, some of which will likely spawn their own buzz phrases. Some of the companies mentioned are on our Hot 100 list. Others are so new, they might make it next year if they successfully navigate the start-up waters.

Internet/Intranet

Internet technology is unleashing a new wave of competitors in corporate software applications. "The Web is causing a major disruption in enterprise software," says George Zachary, a partner at Mohr, Davidow Ventures, a Menlo Park, Calif., venture capital firm. And the established players may not be able to change their focus quickly enough, he says: "A whole new set of tools is needed for the Web vs. the client/server tools currently in use. Some really interesting things have been popping up over the past three to six months."

Internet/Intranet

"A whole new set of tools is needed for the Web vs. the client/server tools currently in use."

— George Zachary, Mohr, Davidow Ventures

So new are the companies he's seeing in this area, Zachary says, that he's not permitted to identify them by name — not even the few in which his company has invested. Founded by small groups of individuals who've left the big enterprise software suppliers, these companies are focusing on such areas as Web-based tools and applications for building, operating and strategically using data warehouses.

Another hot niche is tools for managing supply chains. In this category, Mohr, Davidow has funded ReQuisite Technology and Agile Software Corp., whose software helps with corporate purchasing and product data management, respectively.

Another major opportunity is arising in tools that help people collaborate over intranets — internal communications systems that would "make employees' lives easier," as Zachary puts it. Web technology is "turning groupware on its head," he says. Companies rushing into this space include Actioneer, Inc., Open Text Corp., Netmosphere, Inc. and NetXchange Communications, along with giants Netscape Communications Corp. and Microsoft Corp.

In contrast to Lotus Notes and other early groupware, many of the new breed are tailored to specific types of work.

Netmosphere's ActionPlan program, for instance, helps dispersed software development teams better coordinate their activities across an intranet. Its Java-activated web pages keep all interested parties, including suppliers, upper management and even customers, continually apprised of a project's latest schedules, engineering changes and "to-do" lists.

Actioneer, meanwhile, is designing its collaboration scheme to accommodate mobile, so-called thin-client devices — handheld computers, for example, that get most of their software in the form of Java-based applet programs off the Internet.

Electronic Commerce

Having proved itself for electronic publishing and entertainment, the Internet is finally poised to take on true electronic commerce — especially the more complex, business-to-business variety. The value of business electronic-commerce transactions (including business-to-business and business-to-consumer) will hit $120 billion by 2000, according to some fairly optimistic analysts' assessments. But not without the production of many new products and services, says Bob Chatham, senior analyst at market researcher Forrester Research, Inc. in Cambridge, Mass.

Electronic Commerce

The value of business electronic-commerce transactions will hit $120 billion by 2000, according to some optimistic analysts' assessments.

So-called extranets, which connect a company to its suppliers and customers, are relatively straightforward to wire

Enterprise Networking

"There's a huge market for central-office-like equipment in the IP world."

— Jim Swartz, Accel Partners

up, he points out, but then what? Without specialized software to help administer a trading community of, say, 1,000 companies, the result will be chaos. What's needed is some way to keep the trading partner's client portion of the electronic-commerce software (transaction processing routines, for instance) up to date, maintain directories and control access down to the level of specific employees.

Chatham is seeing start-ups deliver prepackaged solutions for a number of industries. Helping financial firms use the 'net to research reports about fixed income investments, for instance, is a company called PFN, Inc. in Boston and New York. Its software oversees the movement of reports from a shared, central server to each client's server, making sure the latest information is always available.

InStream Corp. in Burlington, Mass., is addressing the mental health care market with a type of workflow software product that coordinates the movement of documents and other information between managed health-care providers and professionals in their offices. "Setups like this will start popping up all over the place," Chatham says.

More generic schemes are in the works, too. Start-ups such as Supplyworks, Ariba Technologies and Actra, the joint venture between Netscape and General Electric Information Services, are scrambling to automate corporate purchasing — arguably the ripest business for Webification right now. Among other functions, their setups will let a supplier of office supplies, for instance, create for each of its customers a tailored catalog that displays only authorized products and prices and that makes sure individual employees don't spend more than their set limits. Purchases will be sent automatically to the supplier, eliminating almost all of the typical $150 cost required to process a traditional purchase order.

Also coming are all-electronic markets, such as the Web-based auction service developed by a start-up called Free Markets Online. It targets markets such as plastic injection molding or metal casting, in which hundreds, or even thousands, of companies may compete for contracts requiring very customized work. After qualifying a good number of, say, injection molders in its comprehensive company database, Free Markets will distribute the required software to them all and, finally, run an electronic auction for its client. Lasting several hours, such auctions can slash the cost of searching for a supplier and produce a 15% to 20% savings in the contract itself.

Enterprise Networking

Of course, by virtue of its booming growth and endlessly extensible protocols, the 'net will constantly demand and absorb every new communications technology that comes its way. But capacity is increasingly an issue, as companies strive to tie far-flung branch offices and factories, their customers and suppliers, telecommuters and legions of road-warrior employees back into the corporate intranet.

Ideally, these users would have enough digital bandwidth for not only simple Web access but also for voice calls and eventually full-blown video-driven multimedia applications. The telephone companies' networks, originally designed for handling voice calls, aren't up to the job, so there appears to be a major opportunity in selling them advanced digital switching gear.

"The phone companies have never understood data, and they never wanted to, but now they absolutely have to," says Ken Zita, an independent telecommunications researcher in New York. Adds Jim Swartz, managing partner at Accel Partners, a major venture capital firm based in San Francisco: "There's a huge market for central-office-like equipment in the IP [Internet Protocol] world. Items such as terabit routers are only a couple of years away." Accel itself has put money on router start-ups Avici Systems, Inc. and Hybrid Networks, Inc.

Faster desktop processors, 3-D graphics and multimedia Web pages are all fueling demand for increased Internet bandwidth. One result: A host of companies are scrambling to corner the nascent market for so-called gigabit Ethernet gear. This equipment will help move and route data packets about 10 times faster than today's products.

New York research firm Technologic Partners has identified 15 such start-ups which, together, have raised more than $75 million in funding, making this "the most competitive market" since the first Ethernet hubs and multiprotocol routers. With names such as Gadzoox Microsystems, Inc. and Yago Systems, Inc., these companies are gearing up to muscle in on the four main suppliers of IP routers: Bay Networks, Inc., Cabletron Systems, Inc., Cisco Systems, Inc. and 3Com Corp.

From $73 million in initial sales this year, according to market researcher Dataquest, the gigabit Ethernet market should grow to $2.9 billion in 2000. By then, even faster networking gear will likely be emerging from laboratories, setting off a new round of competition.

Wireless

The implicit goal of the digital revolution might be stated as "access to any information, anytime, anywhere." And so, as everyone from executives to salespeople and maintenance workers come to depend increasingly on laptop computers, personal digital assistants and other handheld gizmos, demand for reliable, robust wireless links to the Internet is exploding.

Wireless

Wireless is poised to revolutionize standard, fixed-location telephony and cable TV delivery.

Voice-oriented cellular service hasn't really fit the bill, but the wireless industry is spawning dozens of new companies and new technologies that just may do it. What's more, wireless is poised to revolutionize standard, fixed-location telephony and cable TV delivery, as well.

"Wireless will be delivering voice, video and data, and lots of new companies will be needed to develop the required technologies," says Peter A. Rinfret, president of Rinfret & Co., a New York-based investment bank focused on the telecommunications market.

Today's wireless mobile market, consisting mainly of cell-phone service, is already $24 billion a year, and it's predicted to hit $75 billion by 2000. A major component of that will be delivering high-speed Internet access to mobile devices, and that will require new technologies and products for dealing with the inevitable transmission errors.

The big question for the start-ups that will attack those and other technical problems will be which of the many proposed wireless schemes will prevail — and when. The schemes currently run the gamut from all-digital but relatively low-bandwidth personal communications phone service — a competitor to cellular that's just now hitting the U.S. market — to Flash Gordonish setups proposed by Motorola, Hughes Spaceway, and newcomer Teledesic Corp. in which swarms of low-orbit satellites will flood any spot on the earth's surface with megabits of data per second.

Led by cellular pioneer Craig McCaw, Teledesic has some financial backing from Microsoft Chairman Bill Gates. A company called Telegent, meanwhile, has a service that transmits voice calls and as much as 380K bits of data per second to mobile users.

And then there are the fixed-location wireless schemes, another big opportunity for hardware and software makers. Companies such as Cellular Vision USA, Inc., Bosch (using technology purchased from Texas Instruments), Hewlett-Packard Co., NewBridge Networks Corp., Broadband Networks, Inc. and Siemens are all focused on so-called local multipoint distribution systems (LMDS) — a technology that could compete with traditional copper cables for delivering phone, T1-speed data and full video service to homes and businesses. One start-up building an LMDS service is Advanced Radio Telecom of Bellevue, Wash.

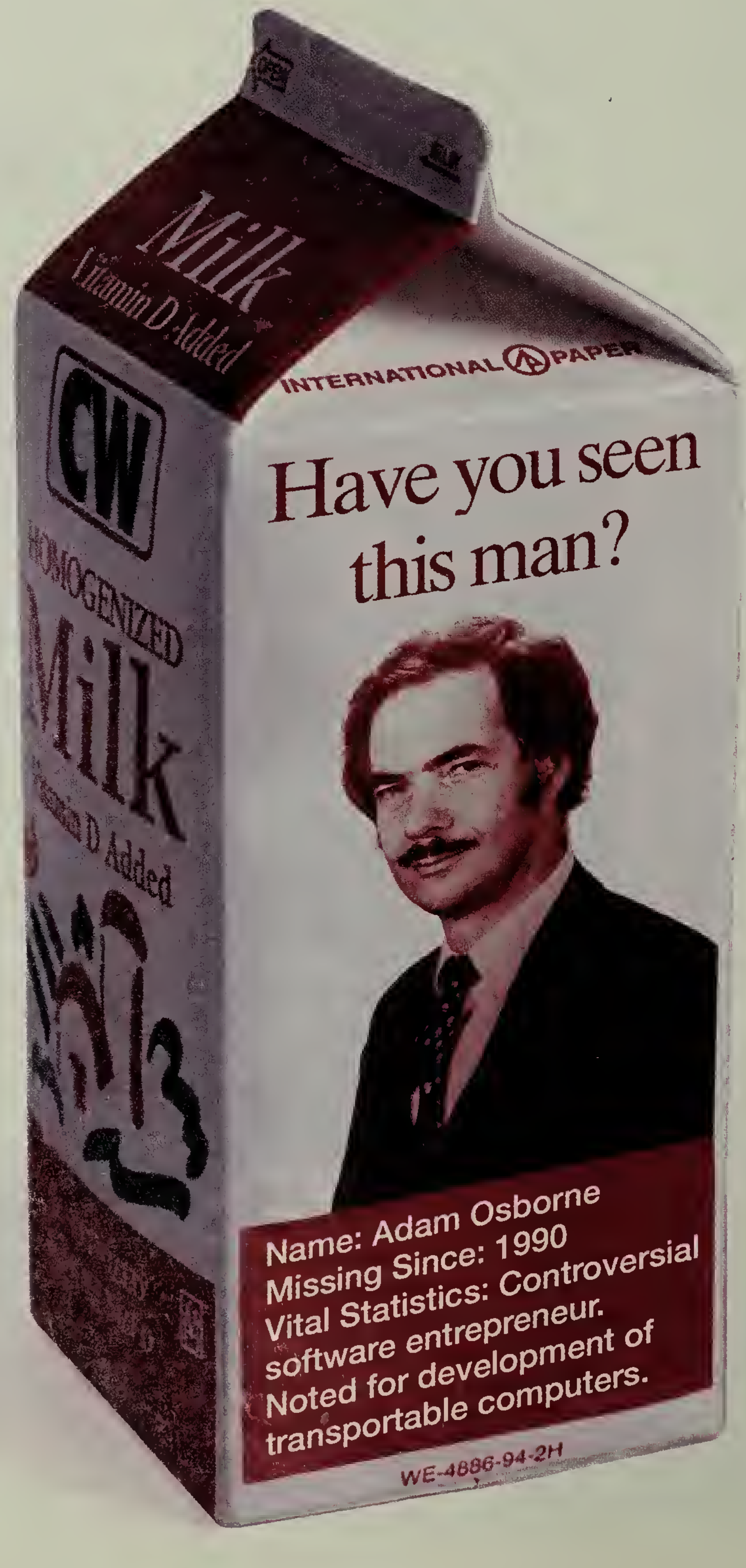
Such new technology, and so many choices, is making for a muddled and somewhat hesitant market — at least for now. "Customers don't understand wireless yet," Rinfret says. "The technology's evolving so fast."

John Verity is a freelance writer based in Brooklyn, N.Y.

Sequel Stories: Why once

By Rochelle Garner

Driven to remain "players," technology entrepreneurs want to prove that their vision is correct — even if the odds are against them


Milk
Vitamin D Added
CW
HOMOGENIZED
Milk
Vitamin D Added
INTERNATIONAL PAPER
Have you seen this man?
Name: Adam Osborne
Missing Since: 1990
Vital Statistics: Controversial software entrepreneur.
Noted for development of transportable computers.
WE-4886-94-2H

Like Rocky Balboa battling through sequel after sequel, many successful high-technology entrepreneurs constantly struggle to recapture their first championship.

It's not about the money. Clearly, such companies as Cirrus Logic, Inc., Ungermann-Bass, Informix Corp. and Digital Equipment Corp. have endowed their founders with the wealth to retire to a life of luxurious obscurity (even if that is contrary to the technology culture, where only "players" have status).

Instead, it's about winning: To prove to the world that their technology vision is correct. Their hope: To match the brilliance of their original start-up.

Odds are, they can't. Venture capitalists say only one in 20 start-ups succeeds. Still, those chances do improve when the founder has already been tested.

"Ventures that get started by someone who did it before have a 1-in-3 chance of success," says Roger Sippl of Sippl/Macdonald Ventures, which invests in early-stage start-ups. "But skill and hard work alone won't do it. You have to be lucky, too." Sippl's name might strike a more-familiar chord when paired with the company he founded: Informix of Menlo Park, Calif.

Clearly, Sippl has experience on both sides of the start-up fence. Since branching into his new field seven years ago, he has made some notable investments, including Vantive Corp., Red Pepper Software (acquired by PeopleSoft, Inc. for $220 million) and Illustra Corp. (bought by Informix for $400 million).

His return on investment has made him extremely, um, comfortable.

Photographic illustration by Dan Board

is not enough

And yet, despite knowing the odds against him, he has stepped back into the management marathon required to run his own start-up: Visigenic Software, Inc., of San Mateo, Calif., which develops software tools to build, deploy and manage the new breed of object applications. This is the ultimate thin-client system, with only the graphical user interface on the user's desktop, and every other process needed by a company scattered across servers dedicated to different applications.

Does he really think Visigenic can eventually match Informix in size and revenue? Without question, although he admits: "It's pretty rare to match that same sort of success." But that's not the only reason he's again decided to head his own company. "I guess you could say I'm in technology jail because I'm good at it," he says. "If I were single, I'd work 10- or 12-hour days because it's fun, and it's fun because you're succeeding. Plus, it's also the sense that you've done something important — that you have a conviction that, despite the naysayers, you proved was right."

Battle Cry

That's definitely driving Ralph Ungermann to spend 15-hour days at his latest venture, First Virtual Corp. in Santa Clara, Calif.

Twice before, Ungermann has tasted the heady wine of industry prescience. Remember Zilog, Inc.? Founded in 1974, Zilog actually had more early PC wins, with its Z80, than did Intel Corp. But when the fun went out of Zilog in 1978, Ungermann turned his attention to a different, unproved technology: local-area networks. So he and friend Charlie Bass sold their Zilog shares to form Ungermann-Bass, at a time when neither venture capitalists nor customers saw a need for such new-fangled computer connections. And yet, despite the world's initial indifference, UB had become a market leader by 1988.

Today, Ungermann aims to achieve the same pioneering success with video networking, which combines videoconferencing with interactive video presentations. "This time, I'm not going to lose that lead," says Ungermann, with absolute conviction. "I'm driven to create something, and the only way to measure success is financial — to be the one company that grows fastest and gets biggest.

"Right now, my guiding star is to take this company public this year, and create billions of dollars of shareholder value," Ungermann says. "That's the scorekeeper in this valley. How else do you know you've won if you don't know what the score is? And winning is important." Then, he adds: "I like the battle. I like the fight."

> "I keep telling myself I'm not doing this to prove something, but to explore something new and to show how something can be done."
>
> — *Ken Olsen*

Fight. Fun. Conviction. These same ingredients help explain the newest object of Ken Olsen's passion: Advanced Modular Solutions, Inc. of Boxboro, Mass. Forced out of Digital Equipment Corp. in 1992, Olsen almost immediately funded and later joined his latest venture, designed to offer fault-tolerant, rack-mounted server and storage systems for Windows NT. Such systems function as computers locked away in a back room, far away from a company's campus in case of disaster. Think of Olsen's products as updated versions of Digital's original minicomputer.

Not exactly common wisdom, is it? "I've always been the iconoclast, always doing things the world is ridiculing," Olsen says. "Most of my years, I've been considered the dumbest man on earth by the Boston Globe. That I didn't understand the mainframe was dead and how could I be so stupid. But I say it isn't dead, and fault-tolerant computers aren't dead. People want reliable computing, especially in industries like telecommunications and finance."

And so, at 71, Olsen finds himself putting in the kinds of hours that many people his age prefer to spend on the golf course. Why does he do it? "You do what seems important, and what's important is the most satisfying," Olsen says. "I keep telling myself I'm not doing this to prove something, but to explore something new and to show how something can be done."

Plus, says Olsen, it's fun. Fun to tempt a bit of risk and danger. Fun to learn something new. And perhaps most of all for Olsen, fun to teach young people the art and skill of running a company. Because, oddly enough, Olsen doesn't rattle on about market presence or solving customers' problems when asked what he hopes to accomplish with his new company.

He talks about building an organization. "In this modern world, people are losing the basics and the passion of running a company by plan, by discipline and by budget," Olsen says. "When budgeting and planning got lost at Digital, Digital deteriorated. I say you should dream about profit-and-loss statements when you drive. You should love it. And I do."

The Player

Let's face it. Building a company takes a decidedly different set of skills than running a large, established organization. That's one reason so many successful entrepreneurs eventually are forced out of the very companies they founded. But once in their blood, the adrenaline rush of start-up fever can't be dimmed.

That — and the fact they crave their old role as "player" — compels them to try again. "You get caught up in the industry, of building a company, of creating not only interesting technology but creating jobs as well," says Mark Hoffman, co-founder and former president and CEO of Sybase, Inc. and president, CEO and chairman of CommerceOne, in Walnut Creek, Calif., which provides interactive systems for electronic commerce between businesses.

Sure, Hoffman could have taken it easy after Sybase's board asked him to

Have you seen this man?

Name: Mitch Kapor
Last seen publicly: at the Electronic Frontier Foundation, though word has it that this founder of Lotus Development Corp. now has a venture capital firm, Kapor Enterprises, in Cambridge, Mass.

hand over day-to-day operations of the company. And, in fact, he was besieged by calls to join venture capitalists, or run other companies' divisions. He wasn't interested. But then he saw CommerceOne, a small start-up that was going nowhere. Hoffman felt he could take the company down paths it only dreamed of. Here was a company trying to compete in a world Hoffman understood: transaction processing, mission-critical and widely deployed applications. And so, when invited to run the company, Hoffman jumped at the chance to once again put in 12-hour days.

"I want to be known for growing great companies and for developing a technology that contributed significantly to the industry," says Hoffman. "CommerceOne has the potential to become as big a company as Sybase did. I want it to play a dominant role."

Redemption

Sometimes, though, a dominant role doesn't do much good — especially in a market going nowhere. Just ask Kamran Elahian, whose Momenta Corp. created a media frenzy around the fizzled market of pen computing. Five years ago, Momenta crashed — burning up $40 million in funding, racking up another $18.4 million in liabilities and costing 150 people their jobs. Those figures placed Momenta among the biggest start-up failures in the industry. And it sent Elahian into an indigo funk. For seven months, he traveled from Fiji to Turkmenistan, like a pilgrim seeking forgiveness.

"I realized that just starting a company for money and fame isn't that interesting."

— *Kamran Elahian*

He got it. As it turns out, venture capitalists *like* someone who's been seasoned by fire. It removes the patina of arrogance that settles over a success-too-easy. And before Momenta, Elahian had founded two easy successes: CAE Systems, Inc., which he sold to Tektronix, Inc. for $75 million, and Cirrus Logic, Inc. So, not long after returning from his world travels, Elahian was approached by Kleiner Perkins Caufield & Byers to once again try his hand at forming a company. The result was NeoMagic Corp., which develops graphics- and video-processors for mobile computers. In three rounds of financing, NeoMagic attracted $20 million from such venture capital heavyweights as Kleiner Perkins, Sequoia Capital, US Venture Partners and Integral Capital Partners.

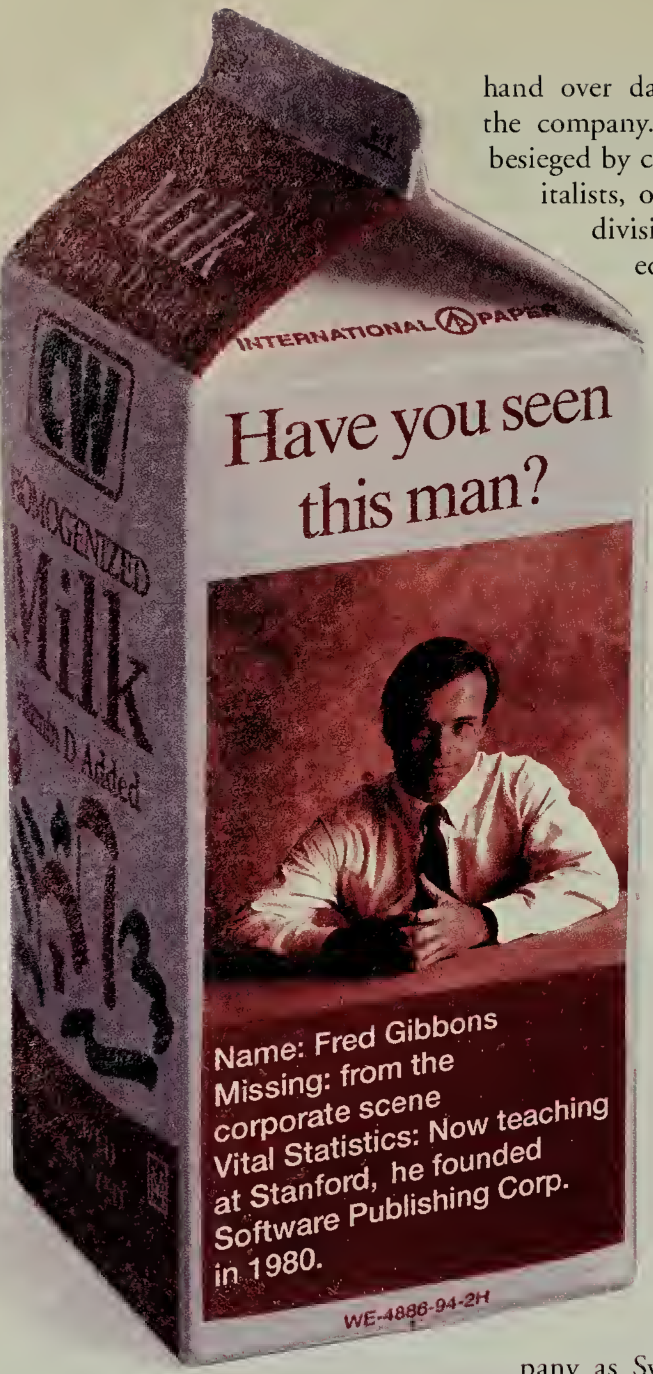
"I could never get such high-powered people to invest in Cirrus Logic, but they said they valued me more for having been through one failure," says Elahian. "Now, I constantly try to remind myself to stay humble. That's why I still have my Momenta license plate." This past March, NeoMagic reaped $36 million in its IPO — allowing Elahian to install that plate on his new Ferrari F355.

Elahian has three other new ventures in the works: PlanetWeb, which develops Internet browser software for the consumer marketplace, Centillium Technology, which is developing chips to reduce the Internet's bandwidth problems, and Projectneat — a nonprofit organization that so far has donated 27-inch televisions and Internet appliances (such as the Sega Saturn) to 5,000 of the world's poorest schools.

"After Momenta, I did a lot of spiritual searching, and I realized that just starting a company for money and fame isn't that interesting,," Elahian says. "I was hit by the notion of bringing the world closer together, of somehow doing something that benefits human beings."

But don't mistake Elahian's newfound spirituality for pure altruism. He's still in the ring, battling for the gold buckle that only champions wear. It's just that he tries to let others share in his championship.

Rochelle Garner is a freelance writer based in San Carlos, Calif.


Milk
CW
INTERNATIONAL PAPER
Have you seen this man?
Homogenized Milk
Vitamin D Added
Name: Fred Gibbons
Missing: from the corporate scene
Vital Statistics: Now teaching at Stanford, he founded Software Publishing Corp. in 1980.
WE-4886-94-2H

Have You Seen This Entrepreneur?

We know they're out there: Once high-flying entrepreneurs who haven't been heard from since being counted out by the industry. You know, people like Fred Wang, Finis (pronounced Fy-nis) Conner, Fred Gibbons and Adam Osborne.

Remember Conner? His Conner Peripherals, Inc. was the fastest growing company in the U.S. But after he sold the company last year, he dropped from sight. But don't put his face on a milk carton just yet. He recently told a reporter that this fall, he'll become "the garbage man of the disk drive industry." And while he wouldn't get into specifics, he did say his company, with the working title of Stor-Recovery, will oversee the reuse of older disk drives.

Then there's Fred Wang, credited with running Wang Laboratories, Inc. (founded by Fred's father, An Wang) into the ground. And while he's still on Wang's board of directors, Wang recently founded his own company: Archive Technologies Corp. in Boston. So what exactly does the company make? It wouldn't say. "We're still a young start-up," says an Archive spokeswoman. "Stay tuned."

Fred Gibbons still hasn't decided whether he'll start another company. Founder and former chairman of Software Publishing Corp., in Mountain View, Calif., Gibbons now teaches business management for engineers at Stanford University's Graduate School of Electrical Engineering. But that role has made him a mentor for wannabe entrepreneurs — as in the young graduate students who went on to found Yahoo. "I walk them through what's needed to get to the stage where they're fundable," Gibbons says. "I'm not an investor in these things; I get paid in stock."

But, says Gibbons, he finds this harder work than actually building a company. "It's hard because you don't have the applause of the crowd, and because it requires more discipline because you can't make people do stuff. You can advise but not force. You have zero control."

And Adam Osborne? Good question. No amount of digging has revealed the whereabouts of the man whose company, Osborne Computer, started the mobile computing market. Maybe if we put his face on a milk carton ...

— *Rochelle Garner*

What's Hot, What's Not

By Howard Anderson

What makes a hot company?

The obvious answer: The right product in the right market with the right distribution and the right strategic partners at the right time. The company doesn't necessarily have to be making money, but it does have to be growing at more than 25%.

Who decides if a company is hot?

The market decides — not the venture capitalists, not the PR flacks, not esteemed trade publications like *Computerworld*. The market decides by its buying power and its search for leadership and technical advantage.

How about reference accounts?

About 300 vendor companies each year visit The Yankee Group, and every single one tells us that Bear Stearns or DuPont or General Electric loves their product. We've gotten cynical about these claims. It's not whether these references have tried, or even bought, the product. Somewhere, sometime they buy one of everything!

The real criteria are: Has the reference account standardized on the product — is this the product that is going to be used throughout the company? Are they putting the product into a production environment?

What single thing makes a company hot?

If it is in the right market sector. It's never the case that there is a hot company in a cold market. If sales force automation is "hot," then companies such as Aurum Software or Siebel Systems may be hot. There also may be "cold" companies in that sector, but there are never hot companies in a cold sector.

Do venture capital companies bet on hot sectors?

No, venture capital companies bet on the next hot sector. That's tough to do. Who knows when these sectors will get hot? Battery Ventures, where I am a general partner, bet on neural networks in 1984. The market got hot in 1994! On the other hand, our investment in Fore Systems paid off 50-to-1 within 24 months.

Does venture capital backing mean that a company is more likely to be "hot"?

Curiously enough — yes! It's damn tough to get a first-tier venture company to invest, even though each year there is $6 billion or $7 billion in new venture funding. There is a rigor and a discipline that venture capital companies look for.

There is a very real difference between hot companies and hot products. We don't expect hot companies to be fully formed yet — they are too new and they are still essentially one-trick ponies. The best of these have products that are leading their market and products that come in families. They scale. There is a connection between the products and the customers. They are getting overseas sales and sales with some volume. Sometimes, though, a product may be worthwhile, but the volume isn't enough to build a company around.

Hot products come first. Then more hot products. Then you are a hot company.

Shouldn't a hot company be ahead of the curve?

Sure, that's axiomatic. But a smart company might have read the tea leaves right — perhaps anticipating that the largest end users, The Yankee Group 200, as we call them, were going whole hog to NT or Windows. That company's innovation, its niche, might have been a product that fit right under that umbrella. But if Microsoft decided to incorporate that feature or that function in its next release, they're toast.

Does that happen often?

About a dozen times a week.

Howard Anderson is the founder, president and managing director of The Yankee Group and one of the founders of Battery Ventures, both of Boston. Anderson was an adviser to Computerworld's "Hot Emerging Companies" project. He can be reached at (617) 956-5000 or at handerson@yankeegroup.com

Anything else make a company "hot"?

Yes, when the company builds an alliance with its end-user customers. Look how Aurum built an alliance with MCI for sales force automation, or how Owens Corning built one with SAP for worldwide finance. Those are the kinds of alliances that will scale and then port to other companies.

Can you be a hot company and not have hot products?

No. Hot products come first. Then more hot products. Then you are a hot company. And if you can do it long enough, you become a great company. Examples: Compaq. Oracle. Microsoft. The entire industry was built on hot products; the best companies were able to build a system of hot products. Every one of our end-user clients says the same thing to us: "We want fewer vendors, but we want more from them!"

For a company to break into that space means that they have to either dislodge the incumbent or convince the user that his homegrown solution is both too expensive and underpowered. No company starts life as a "strategic" vendor; it's earned.

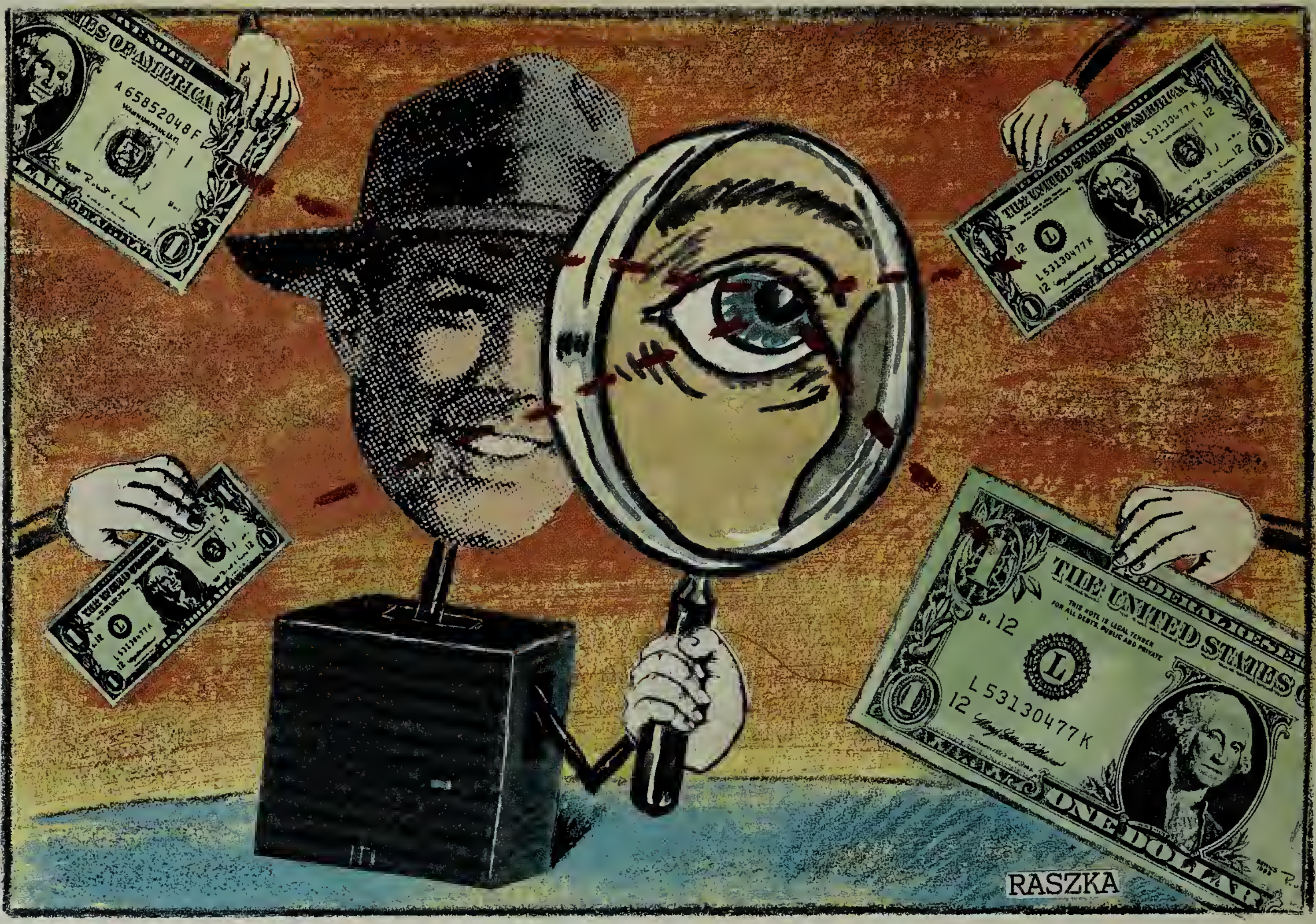
Final thoughts:

Every user should take part of the IT budget and take some degree of risk with hot companies and products. Not a lot, maybe 4% of the total budget. It is with these "hot" products that true breakthroughs occur. But those users have to be sure of a few things, all of which come under the heading of due diligence. A sampling:

- What are the other products promised? When are they going to come? How many engineers does the company have dedicated to that project?
- How good is the management of the company? Are they the founders or hired guns? What has their track record been? You will always be told that the "venture capitalists" are solidly behind the company. Are they? Talk to people who really know.
- How good is the marketing? Remember, a company may have great technology and stable financing, but if it can't market, it will miss its numbers and it will starve support.
- Don't just talk to the early users — go visit them! In their shop — and without your vendor "handler" going along.

By Rochelle Garner

Young firms need money and influence — and investors of all walks are lining up to provide them with both



Looking for cash?

You may not need to go far

You're in luck.

Investors of just about every sort — from angels to venture capitalists, with big business in between — are lining up to give young businesses new money.

We're not exaggerating. In Boston and New York, local newspapers constantly carry advertisements from self-proclaimed "angels" looking for promising start-ups. In Silicon Valley, where funding has become high art, an "old boy" network of technology high rollers constantly scopes out the Next Big Thing to put money on. And around the world, big business seeks out a stake in new technologies that could bolster their current markets or give them an edge in new ones.

Yes, they all write checks. But each kind of investor has its own agenda in bankrolling a start-up. That agenda can undermine your marketing efforts, contradict your business plan — or propel your company into a lucrative IPO. It's for this reason that start-up veterans advise new entrepreneurs to offset risk by combining traditional venture capital with angels, institutional partners and corporate investors. And if you want to move up the money chain, timing matters.

"It's rare to get corporate financing without first having received venture financing," explains David Liddle, CEO of Interval Research Corp., a "start-up incubator" in Palo Alto, Calif., that provides literally everything a new company could need to become successful.

Adds Les Vadasz, Intel Corp.'s senior vice president of corporate business development: "Sometimes, we'll walk away from investing when a venture capitalist isn't involved. That [absence] can say that the company's management isn't flexible enough to listen to outside voices who can help grow the company."

So why would start-ups steer clear of venture capitalists? Because of the way VCs do business. Investing $1 million and more for a majority stake in a company, venture capitalists can — and sometimes do — remove a founding entrepreneur from the helm of a struggling company.

But, some experienced entrepreneurs say, that shouldn't matter.

"I say, don't worry about losing control. You will either be in control or you won't — it has nothing to do with the percentages the VCs have in your company," says Adi Gamon, president and CEO of Carnelian, Inc., a start-up that sprang from Interval Research to provide publishing systems on the Internet. "It's a mistake to go after a lower class of investors just because you think you'll have more control. I say the better the investor, the better your chance of succeeding. Their connections, their wisdom, their ability to help you, especially when you don't want to be helped, will all make your stock worth more."

Clearly, whom you approach for cash is as strategic a decision as any you'll make.

Investor Portfolio

Hugh Mackworth, president and CEO of Digimarc Corp., definitely exercised care in the feeding of his company.

Based in Portland, Ore., Digimarc has developed digital "watermark" technology that embeds copyright information inside graphic art and photography. Click on an electronic rendering of a picture and — voila — see who created it. That capability could have huge ramifications for professional artists, if it can find a way to pervade the entire graphic arts industry.

Some of Digimarc's most recent investors give it a huge leg up. These include Just Systems Corp., a Japanese software developer and distributor that plans to include Digimarc's technology in its own products, and Adobe Ventures, the venture funding organization founded by Adobe Systems, Inc. That endorsement has led to Adobe incorporating Digimarc technology in every copy of its Photoshop product. Presto: Instant credibility, automatic distribution, valuable business and customer contacts, and entree into Adobe's labyrinthine organization for potential additional alliances. Other investors include AVI Capital in Los Altos, Calif., and Softbank Holdings, the venture capital arm of Japanese conglomerate Softbank Corp.

"By getting both sides, we have the independence and perspective that a venture firm can provide, as well as a close relationship with corporate partners," says Mackworth. "The kind of strategic relationships we have with Adobe is critical to our success in this country. But at the same time, if Adobe were our only investor, then Micrografx, Corel and Live Picture would be less enthusiastic in working with us. You have to be careful not to alienate anyone by the investors you keep."

In other words, Mackworth has successfully balanced his investor portfolio. That's key, say those who've played the funding game. And the reason has to do with why corporations invest: They want to fuel their own growth. Sometimes, that means funding companies whose products rely on these larger corporations' technology — and, thus, grow the market. Sometimes, it means endorsing new technology that these companies can themselves use.

"Corporate investing will become an even greater trend, especially among companies that feel they need to be involved in early technologies that will impact their business in a strategic way," says Carnelian's Gamon. "Sure, strategic investors often come in at a higher valuation per share than a VC will, because corporations are looking at what you can do for their business. But relying on strategic investors can be dangerous, since their goals can change and their interest in your company can go away. That's why you want to make sure to have investors who are in it purely for the financial gain."

VeriSign, Inc. of Mountain View, Calif., has that sort of investor in Bessemer Venture Partners and Kleiner Perkins Caufield & Byers. These top-tier VC firms added their muscle in VeriSign's second round of financing. But it's VeriSign's third round, totaling $30 million, that earned *Red Herring* magazine's award for Best Strategic Financing Round of 1996. For VeriSign, which is in the digital certificates business, its investors are its customers. And they include Microsoft Corp., Cisco Systems, Inc., Reuters Ltd., Merrill Lynch, Softbank, First Data Corp. and Intuit, Inc.

"We realized we had to be careful not to pick investors who could alienate potential customers," acknowledges Stratton Sclavos, president and CEO of VeriSign. "That's why the most important thing we did before embarking on this round was create a list of companies from various industries we thought would make sense strategically."

No, Sclavos isn't using "strategy" as just another platitude. He and his chief financial officer, Dana Evans, deliberately went after investors that could come to the table with more than money. "When drawing up that kind of list, it's important to think about the strategies you are trying to execute on," Evans says. "In our case, it was distribution channels and driving market adoption. We went after companies we thought could help with those aims."

Creative Funding

Katrina Garnett believes the same should be true of individual investors. "You can have active or passive investors. I chose active investors because there's so much value in their participation," says Garnett, founder and CEO of CrossRoads Software, Inc. in Burlingame, Calif. A former Sybase, Inc. executive, Garnett and her husband, Terry, formerly of Oracle Corp., also put in $3.5 million during the course of three rounds of financing.

Garnett's list of "active" investors sounds like a "Who's Who" of high rollers: Michael Dell (the guy with the computer company down in Texas); Dave Duffield, chief executive officer of PeopleSoft, Inc.; Andy Ludwick, former CEO of Bay Networks, Inc.; Roger Sippl, founder and former CEO of Informix Corp.; and Frank Quattrone, CEO of Deutsche Morgan Grenfell Technology Group.

Clearly, these people have a fair amount of disposable income — and a healthy knowledge of the computer industry. For Garnett, the combination is ideal.

"If someone writes a personal check for $1 million, he wants to know about every decision I make, and he wants to do all he can to help me become successful," Garnett says. "They all review the business plan, they all have a great personal network to tap into. With one VC firm, you get the benefits of that one firm. I have 50 different investors that all bring their connections to me."

Although almost all of Garnett's investors are individuals, she did persuade a few high-profile corporate and institutional investors to back her venture, too. (More than she was looking for, in fact. The company was seeking $8 million in its recent round of funding and raised $12 million, instead.) Founded to integrate enterprise applications from different vendors, with general availability slated for year's end, CrossRoads has received funding from such heavyweights as Intel, Venrock Associates, SAP AG and Ernst & Young.

In practically every case, each offers more to CrossRoads than money. Take SAP, for example. It provides insight into the complex workings of its R/3 enterprise system. And Ernst & Young? It's actually sending people to Burlingame to help CrossRoads with its development projects and is its initial professional services partner.

Time will tell if Garnett's selectivity in raising capital benefits her investors by means of a lucrative IPO sometime down the road. Nonetheless, she deserves credit for having learned the lessons taught by other start-ups. "Your investors are a critical success factor," says Carnelian's Gamon. "A check is a check. It's what they do besides that counts."

Rochelle Garner is a freelance writer based in San Carlos, Calif.

Hatching an idea

There's a relatively unknown source of funding, one that's potentially rich in value but fairly difficult to tap into, called the start-up incubator.

The best known are Interval Research Corp. in Palo Alto, Calif., and Idealab, Inc. in Pasadena, Calif. Both have different charters but claim to handle just about everything possible for a toddling start-up struggling to run: legal counsel, administrative help, designers, programmers, access to some of the finest business minds in the industry and enough money to last a while.

The difficulty? Getting Interval Research to notice an outsider's idea is next to impossible. (The incubator tends to commercialize internally generated ideas.) Idealab, while advertising for business ideas, has so far given birth only to ideas that sprang from the head of its founder, Bill Gross.

One such business is Ideamarket, based in Austin, Texas. Its aim is to sell intellectual property (a la analysts' reports and articles) on a pay-per-view basis. Gross conceived the idea, brought in computer press columnist Jim Seymour as a partner, then recruited Peter Lewis of the New York Times as vice president/editorial director.

"Idealab is a shared pool of legal professionals, administrators, designers and programmers that we can tap into at any time," Lewis says. "Plus, Bill [Gross] gave us $1 million in seed money, as well as providing contacts to top-tier venture capitalists."

Periodically, all of the CEOs from the Idealab family get together to kick around ideas and advice. "It's a deluxe way to start a company," Lewis says.

— *Rochelle Garner*

100 Hot Emerging Companies

Name	City	State	Product Description/Category	President/CEO	Employees
3Dfx Interactive, Inc. www.3dfx.com	San Jose	CA	3-D graphics accelerator chip set for high-performance simulation	L. Gregory Ballard	103
Acacia Networks, Inc. www.acacianet.com	Lowell	MA	Programmable, stackable switch, supports 10M bit/sec.,100G bit Ethernet speeds and Web management	Michael P. Gagnon	70
Actioneer, Inc. www.actioneer.com	San Francisco	CA	Groupware to capture and share action information with anyone on the Internet, linking them on-the-fly to people, projects, documents, time and place	Brian Smiga	25
Active Software, Inc. www.activesw.com	Santa Clara	CA	Java-based software that allows organizations to integrate the information resources across the enterprise	Stephen MacDonald	40
Actuate Software Corp. www.actuate.com	San Mato	CA	Provides distributed reporting from databases	Nico Nierenberg	75
Allaire Corp. www.allaire.com	Cambridge	MA	Rapid application development system for building interactive Web sites	David J. Orfao	72
Alternate Solutions, Inc. www.altsol.com	Camp Hill	PA	Design, installation and support services for LAN and WAN networks	Jeff Colosimo	50
Arbor Software Corp. www.arborsoft.com	Sunnyvale	CA	OLAP server optimized for management reporting, planning, analysis and data warehousing applications	John Dillon	250
Art Technology Group www.atg.com	Boston	MA	Personalized marketing and selling software	Jeet Singh	115
Brightware, Inc. www.brightware.com	Navato	CA	Automated inbound telemarketing agent that reads and fulfills customers electronic requests	Chuck Williams	125
BroadVision, Inc. www.broadvision.com	Los Altos	CA	Software for development and operation of Internet, intranet and extranet business applications	Pehong Chen	200
Calico Technology, Inc. www.calicotech.com	San Jose	CA	Electronic commerce buying and selling system	Alan Naumann	85
Check Point Software Technologies Ltd. www.checkpoint.com	Redwood City	CA	Enterprisewide security framework for Windows NT and 95	Gil Shwed	150
Clarify, Inc. www.clarify.com	San Jose	CA	Client/server customer service and support applications	Dave Stamm	400
Concentric Network Corp. www.concentric.net	Cupertino	CA	Dial-up Internet access/Web hosting and service provider	Henry R. Nothhaft	350
Cruise Technologies, Inc. www.cruisetech.com	Arlington Heights	IL	Wireless handheld device that remotely accesses a server	Chris Gladwin	33
Cybercash, Inc. www.cybercash.com	Reston	VA	Digital currency	Bill Melton	225
CyberGuard Corp. www.cyberguardcorp.com	Fort Lauderdale	FL	Network security software	Robert L. Carberry	120
CyberSafe Corp. www.cybersafe.com	Issaquah	WA	Client/server authentication software	Daniel Webb	176
DataMind Corp. www.datamindcorp.com	San Mateo	CA	Server-based data mining tools	Eric Archambeau	43
Dazel Corp. www.dazel.com	Austin	TX	Output management software	William Bock	100
DeltaPoint, Inc. www.deltapoint.com	Monterey	CA	Web site creation and management tools; Web site animation and multimedia creation software	Jeffrey F. Ait	50
Diamond Lane Communications Corp. www.dlcc.com	Petaluma	CA	High-speed Internet and XDSL access technology	George Hawley	62
Diffusion, Inc. www.diffusion.com	Mountain View	CA	Push technology and management tools for groupware, E-mail and fax	Jim Gagnard	40
Diva Communications, Inc. www.diva.com	Oakland	CA	Manufacturer of digital, wireless gear	Amine Haoui	50
Eagle River Interactive, Inc. www.eriver.com	Chicago	IL	Interactive CD-ROMs for the Internet	Terry Graunke	600
Edify Corp. www.edify.com	Santa Clara	CA	Agent technology for self-service applications	Jeffrey Crowe	300
Evolutionary Technology Internat'l, Inc. www.evtech.com	Austin	TX	Tool that automates extraction, transformation and migration of data in diverse computing environment	Katherine Hammer	175
Excite, Inc. www.excite.com	Redwood City	CA	Internet search engine	George Bell	200
First Virtual Corp. www.fvc.com	Santa Clara	CA	Products that deploy business-quality video over ATM and Ethernet	Ralph Ungermann	55
Forte Software, Inc. www.forte.com	Oakland	CA	Application development environment to build, deploy and manage distributed computing applications	Martin J. Sprinzen	400
Foundry Networks, Inc. www.foundrynet.com	Sunnyvale	CA	Gigabit Ethernet switches	Bobby Johnson	50

Source: Computerworld and company reports; information as of Sept. 1, 1997.

Key Funding Sources*	Year Founded	Public/Private
VenRock; U.S. Venture Partners; Chemical Venture Partners; NorWest Venture Partners; $33M raised in June 1997 IPO	1994	Public
Alpine Technology Ventures; Ray Stata; $7M	1995	Private
Privately funded	1994	Private
Enterprise Partners; KPCB; Sierra Ventures; Lehman Brothers; Bayview; $12M	1995	Private
Accel Partners: $1M; Mohr, Davidow: $3.5M; Sequoia Capital: $4M	1993	Private
BankBoston Ventures, Inc.; Polaris Venture Partners; $9.3M. other venture partners: $2.3M	1995	Private
Internally funded	1990	Private
Hummer Winblad; Sequoia Capital; Accel Partners; $25M raised in 1995 IPO	1991	Public
Softbank Ventures, Inc.: $3M	1991	Private
Norwest Venture Capital; Venrock Associates: $3M; J.P. Morgan	1995	Private
Sutter Hill Ventures; The Mayfield Fund; Itochu; Ameritech; $10.2M. June 1996 IPO: $21M	1993	Public
KPCB; Integral Capital; Mayfield Capital; $4M	1994	Private
June 1996 IPO: $30M	1993	Public
December 1995 IPO: $24M	1990	Public
Racal-Datacom; Softbank Holdings; Telecom Italia; $55M. Montgomery Sec.: $25M; GS Capital; KPCB; $10M	1991	Private
Battery Venture Partners; Bessemer Ventures; $12M.	1997	Private
Intel; Cisco; Verifoam; $10M. February 1996 IPO: $40M	1994	Public
NA	1994	Public
Accel Venture Partners; Polaris Venture Partners; $6M	1991	Private
Atlas Venture; Draper Fisher; Sequoia Capital; Sofinnova; $13M	1994	Private
Sevin-Rosen; Austin Ventures; SSM Venture Partners; Sigma Partners; $16.7M	1991	Private
December 1995 IPO: $6.6M	1995	Public
Sevin-Rosen; KPCB; Crosspoint Venture Partners; Oak Investment Partners; $17.5M	1995	Private
IVP; Matrix Partners; Brentwood Venture Capital; $11M	1995	Private
Crosspoint Ventures; Brentwood Venture Capital; Burr, Egan Deleage Venture Capital; $38M	1993	Private
March 1996 IPO: $45M	1994	Public
Sutter Hill Venture Capital; Highland Capital Investors; $24.2M. March 1996 IPO: $39.2M	1990	Public
Bob Inman; Menlo Ventures; Arete Ventures; New Enterprise Assoc.; Cornerstone Equity Investors; Bank of Boston; $15M	1991	Private
April 1996 IPO: $34M; Intuit: $40M	1994	Public
Private sources; Accel Venture Partners; AT&T Ventures	1993	Private
March 1996 IPO: $35M	1991	Public
Crosspoint Venture Partners; IVP; Dixon Doll; $5.75M	1996	Private

* Dollar amounts are totals for all sources listed, unless they directly follow a source.
KPCB = Kleiner Perkins Caufield & Byers Java Fund. IVP = Institutional Venture Partners.

Amos Wilnai

MMC Networks aims to be Intel of networking

Tiny MMC Networks, Inc. — whose not-so-modest goal is to be the Intel Corp. of networking — is prospering as much for what it hasn't done as for what it has done in the technical boxing ring.

The Sunnyvale, Calif., silicon designer, which makes innovative Asynchronous Transfer Mode, Ethernet and fast Ethernet switching chip sets, has become an ally of such market leaders as Cisco Systems, Inc., rather than a thorn in their sides.

"We have done joint development, and it has been a very synergistic relationship," says Anthony Alles, director of ATM and gigabit Ethernet product marketing for Cisco, which first incorporated MMC Networks' chip set in its ATM switch systems in late 1995. "They have world-class ASIC design capabilities, and over time, they have developed networking expertise of their own."

The $10 million company, which turned the corner — and its first profit — during the first quarter of 1996, attributes its mounting success to its fundamental ViX switching architecture that is etched into the company's chip sets. The architecture, which significantly improves on the so-called crossbar data switching method, is a shared memory architecture and wide internal bus that provides enormous bandwidth for makers of switching systems.

Implementing MMC Networks' chip sets enable OEMs to provide switching systems that can support robust, bandwidth-intensive applications such as videoconferencing between companies at low cost.

Additionally, in May, the company introduced a technology that revolutionizes the design of Ethernet and ATM switches and routers to support hundreds of thousands of data queues — for both frames and cells — by allowing priority routing for individual users and faster IP multicast delivery. This means certain traffic can be routed by priority at cost. Analysts and financial backers are bullish about the technology.

"The engineering team is very talented and has developed a unique, systems-oriented architecture in silicon," says Geoff Yang, a general partner with Institutional Venture Partners (IVP), one of three initial investors that invested $3 million in the company in July 1994.

The $10 million company attributes its success to its fundamental ViX switching architecture etched into its chip sets.

Financially, the company is in solid shape. Yang says IVP helped steer MMC Networks away from disaster, urging company founders to become an OEM supplier and a partner to switch-system manufacturers, rather than a competitor. The company has been profitable for six consecutive quarters and has barely dipped into the total $10 million in venture capital funds raised since its founding in September 1992, he adds.

With the revolution in corporate networking under way, MMC Networks seems well positioned to ride the wave of the Internet. Nevertheless, the silicon developer has to guard against competition in the shadows and the risk of growing too quickly, observers say, pointing out the drought of talented engineers.

Amos Wilnai, founder and chairman of MMC Networks, declined to say how profitable the company is, except to note that profits represent a "significant percent" of the $10 million in revenues during 1996.

By Paula Rooney, a freelance writer in Boston.

Name	City	State	Product Description/Category	President/CEO	Employees
GeoTel Communications Corp. www.geotel.com	Littleton	MA	Intelligent call router	John Thibault	100
GlobalCom, Inc. (No Web site)	Wyckoff	NJ	Network services for sales and support environments	Matthew Ryffel	NA
Icat Corp. www.icat.com	Seattle	WA	Electronic commerce catalog software developer	Craig Danuloff	120
Ichat, Inc www.ichat.com	Austin	TX	Interactive, Internet-based communications software	Mark Saul	72
Imedia Corp. www.imedia.com	San Francisco	CA	Video compression technology	Efi Arazi	20
IMR, Inc. www.imrgold.com	Englewood	CO	Archival and retrieval software for CD-ROMs	Robert Drucker	42
Informatica Corp. www.informatica.com	Menlo Park	CA	Client/server tools for building, deploying and managing data marts	Diaz Nesamoney	89
Information Advantage, Inc. www.infoadvan.com	Eden Prairie	MN	OLAP and ROLAP software	Larry Ford	227
Infoscape, Inc. www.infoscape.com	San Francisco	CA	Tools for creating and deploying Java-based intranet applications	Paul King	16
Infoseek Corp. www.infoseek.com	Sunnyvale	CA	Infoseek Internet search engine	Harry M. Motro	160
Infospinner, Inc. www.infospinner.com	Richardson	TX	Software for linking Web pages to corporate applications and data repositories	Yoshi Noguchi	17
Inktomi Corp. www.inktomi.com	San Mateo	CA	Parallel computing architecture for Internet search engines using coupled cluster technology	David Peterschmidt	45
Insource Technology Corp. www.insource.com	Houston	TX	Corporate risk assessment, Web development and service provider	David Black	57
International Network Services www.ins.com	Sunnyvale	CA	Network integrator providing planning, design and implementation services	Donald McKinney	800
Intrusion Detection, Inc. www.intrusion.com	New York	NY	Windows NT security assessment and reporting tool	Robert Kane	27
KIVA Software Corp. www.kivasoft.com	Mountain View	CA	Server for deploying and managing Web-based business applications	Keng Lim	40
Lycos, Inc. www.lycos.com	Framingham	MA	Internet search engine	Robert J. Davis	125
Marimba, Inc. www.marimba.com	Palo Alto	CA	Push technology to distribute and maintain software and content within an organization or across the Internet	Kim Polese	50
MMC Networks, Inc. www.mmcnet.com	Sunnyvale	CA	Packet switching technology for ATM and Ethernet networks	Prabhat K. Dubey	50
Narrative Communications Corp. www.narrative.com	Waltham	MA	Provides feature-length interactive multimedia over the Internet	Scott Kliger	30
NetCentric Corp. www.netcentric.com	Cambridge	MA	Allows ISP to rapidly deploy and manage advanced network and telephony services	Sean O'Sullivan	50
NetDynamics, Inc. www.netdynamics.com	Menlo Park	CA	Java-based Web application development environment	Zack Rinat	85
NetIQ Corp. www.netiq.com	Santa Clara	CA	Centralized application management suite for distributed Windows NT and BackOffice applications	Ching-Fa Hwang	55
Network Appliance, Inc. www.netapp.com	Santa Clara	CA	Dedicated network file server for optimizing I/O	Daniel Warmenhoven	300
Network Integrity, Inc. www.netint.com	Marlboro	MA	Backup and recovery software for NetWare environments	John Butler	40
OnDisplay, Inc. www.ondisplay.com	San Ramon	CA	Software that enables Web data to be integrated with business applications	Mark Pine	50
Open Horizon, Inc. www.openhorizon.com	San Francisco	CA	Client/server middleware that integrates custom and off-the-shelf applications with databases	Bruce Coleman	45
Open Market, Inc. www.openmarket.com	Cambridge	MA	Software to build transaction oriented business-to-consumer and business-to-business Internet commerce environments	Gary Eichhorn	550
Optimal Networks Corp. www.optimal.com	Palo Alto	CA	Windows-based distributed application performance analyzer for IP networks	Maurice Bailey	NA
Packet Engines, Inc. www.packetengines.com	Spokane	WA	Gigabit Ethernet full-duplex repeater	Bernard Daines	100
Passport Corp. www.passportcorp.com	Paramus	NJ	Java-based client/server 4GL for building Internet and intranet applications	Richard Ramsdell	50
Persimmon IT, Inc. www.persimmon.com	Durham	NC	Software and services for distributed sales and service applications	Ian Jones	90
Persistence Software, Inc. www.persistence.com	San Mateo	CA	Software to define, generate and map snap-in objects	Christopher Keene	50
Placeware, Inc. www.placeware.com	Mountain View	CA	Interactive, multimedia Web environment for building and viewing live presentations	Bill Shott/Richard Bruce	20

Key Funding Sources *	Year Founded	Public/Private
Venture capital funding; November 1996 IPO: $24.5M	1993	Public
Privately funded	1995	Private
NA	1993	Private
Onset Ventures; Ziff Brothers Investments; $4.5M latest round	1995	Private
Privately funded	1994	Private
International Capital Partners: $1M	1992	Private
Bay Partners; Discovery Ventures; Partech International; Integral Capital Partners	1993	Private
Norwest Ventures; Sutter Hill; Menlo Partners; St. Paul Ventures; $13M	1990	Private
RedLeaf Venture Management Partners	1995	Private
June 1996 IPO: $41.4M	1994	Public
Privately funded	1995	Private
Oak Investment Partners: $8M	1996	Private
Privately funded	1992	Private
September 1996 IPO: $42M	1991	Public
Privately funded	1991	Private
Weiss, Peck & Greer: $2M; Greylock: $2M; Discovery Ventures; $500,000; Sippl Macdonald Ventures: $300,000	1995	Private
March 1996 IPO: $87M	1995	Public
KPCB: $4M	1996	Private
IVP; U.S. Venture Partners; KPCB; JAFCO; $10M	1992	Private
Greylock Management; Accel Partners; $8M	1995	Private
North Bridge Venture Partners and Matrix Venture Partners: $2.1M; private sources	1995	Private
Hummer Winblad; U.S. Venture Partners	1995	Private
Privately funded	1995	Private
November 1995 IPO: $36.4M	1992	Public
Atlas Venture; KPCB; Matrix Partners; New Enterprise Associates; JAFCO; $10.8M	1993	Private
Matrix Partners, Atlas Venture; Norwest; $10M	1996	Private
U.S. Venture Partners; PeopleSoft, Inc.; Mitsui & Co.; $11M	1993	Private
May 1996 IPO: $76M	1994	Public
Madge Networks; Greylock Management; U.S. Venture Partners; Cabletron Systems, Inc.	1993	Private
Mayfield Fund; Battery Ventures: $7.5M; 21st Century Communications Partners: $15.9M	1994	Private
Charles River Ventures and others: $3M (latest round)	1990	Private
Self-funded	1993	Private
Morgan Stanley: $4M; Thompson Clive; private sources	1991	Private
InterWest Partners; Bay Partners; Xerox; $5M (first round)	1996	Private

* Dollar amounts are totals for all sources listed, unless they directly follow a source.
KPCB = Kleiner Perkins Caufield & Byers Java Fund. IVP = Institutional Venture Partners.

INS 'network wizards' meet service need

Don McKinney

It was 1991, and Don McKinney saw that companies were beginning to connect their PCs. His idea: Provide companies with the expertise to build and manage such systems.

Today, his company, International Network Services (INS) in Sunnyvale, Calif., has revenue approaching $100 million and a secure foothold in a market otherwise dominated by behemoths such as Andersen Consulting and Pacific Bell.

The fact that INS identified the demand for network experts years ago and has focused exclusively on network services accounts for much of the company's success, says Alice Murphy, senior analyst at research firm Dataquest in Westboro, Mass. McKinney's background — with start-up work at Silicon Graphics, Inc. and Electronics for Imaging, Inc. and a stint at venture capital firm Sequoia Capital Partners — helped, too.

INS employees, known as "network wizards," typically spend six months or more solving their customers' most complicated networking problems. INS also offers EnterprisePro, a network management tool. Among the company's clients: BankBoston, a $64 billion bank whose network recently tripled to more than 20,000 desktops after a merger.

INS' revenue leaped from $150,000 in 1992 to $44.1 million last year; this year, company officials expect revenue to be $99.5 million. An initial public offering last year generated about $42 million.

And McKinney is already eyeing more challenges, including growing the electronic services part of the business.

By Louise Fickel, a freelance writer in Yellow Springs, Ohio.

Edifying the future of automated phone systems

When Jeffrey Crowe and a group of high-tech industry veterans founded Edify Corp. in 1990, "we consciously selected what we thought was going to be a large market: Large organizations that are constantly looking for ways to communicate valuable information to their customers and employees" more cheaply and more efficiently.

Enter, the Santa Clara, Calif., company and its so-called "self-service" agent software. It lets companies, for instance, put lengthy voice-mail messages with menu options on their phone lines and also provides them with a secure gateway into customer information on a customer's database.

From an initial investment of less than $9 million in venture capital, Edify has been growing at an exponential rate. Fourth-quarter 1996 revenue stood at $11.2 million — up more than 100% from the previous year.

Jeffrey Crowe

Edify products, such as ESY for PeopleSoft HRMS and Electronic Workforce, have struck a chord with corporate America; customers include Ford, Frito-Lay, L.L. Bean and Brandeis University.

For the future, Crowe says, the challenge is going to be how to "move as quickly as a $50 million company as we could when we were a $5 million one." Edify sees its growth in various market segments, as businesses both big and small turn to automated information delivery.

By William Spain, a freelance writer in Chicago.

Name	City	State	Product Description/Category	President/CEO	Employees
PointCast, Inc. www.pointcast.com	Cupertino	CA	Internet/intranet push technology for disseminating news	Chris Hassett	260
Polycom, Inc. www.polycom.com	San Jose	CA	Full duplex group conference phone	Brian Hinman	167
Premisys Communications, Inc. www.premisys.com	Fremont	CA	Technology that integrates voice, data, ISDN, frame relay and ATM into single small enclosure	Raymond C. Lin	240
Prism Solutions, Inc. www.prismsolutions.com	Sunnyvale	CA	Software to design, build and populate data warehouses	Warren Weiss	225
Progressive Networks, Inc. www.realaudio.com	Seattle	WA	Streaming audio technology for the Web	Bruce Jacobsen	265
Quadritek Systems, Inc. www.quadritek.com	Malvern	PA	Software managing IP addresses and network services for TCP/IP networks	Joe D'Andrea	70
Radnet, Inc. www.radnet.com	Cambridge	MA	Development environment for collaborative Web applications	Don Bulens	62
Rambus, Inc. www.rambus.com	Mountain View	CA	High-speed interface technology to speed data transfer to 600M byte/sec. over narrow byte-wide data bus	Geoff Tate	135
Raptor Systems, Inc. www.raptor.com	Waltham	MA	Firewall for NT applications	Shaun McConnon	126
Remedy Corp. www.remedy.com	Mountain View	CA	Client/server application suite for help desks	Larry Garlick	546
Sagent Technology, Inc. www.sagenttech.com	Palo Alto	CA	Software to connect data marts to the Internet	Ken Gardner	70
Scopus Technology, Inc. www.scopus.com	Emeryville	CA	Client/server application suite for customer service, sales and support	Ori Sasson	330
Siebel Systems, Inc. www.siebel.com	San Mateo	CA	Client/server sales force automation software	Tom Siebel	250
Sovereign Hill Software, Inc. www.sovereign-hill.com	Dedham	MA	Information retrieval system for distributed data sources	Dave Champagne	40
Stardock Systems, Inc. www.stardock.com	Livonia	MI	Object software for extending 32-bit applications and utilities that run under OS/2 and Windows	Brad Wardell	NA
Starlight Networks, Inc. www.starlight.com	Mountain View	CA	Multimedia networking software to store and deliver streaming data types, such as digital motion video and audio	James Long	85
SynQuest, Inc. www.synquest.com	Norcross	GA	Real-time application for planning and manufacturing	Joseph Trino	150
Tally Systems Corp. www.tallysys.com	Hanover	NH	PC hardware/software asset management tools	Ted Jastrzembski	130
The Allegro Group, Inc. www.allegro-group.com	Dayton	OH	Gateway to connect LAN-based mail systems the Internet	Aaron Fessler	20
Torrent Systems, Inc. www.torrent.com	Cambridge	MA	Application development environment for building scalable symmetric and multiprocessing systems	Allen Razdow	25
US Web Corp. www.usweb.com	Santa Clara	CA	Internet/intranet professional services	Joseph Firmage	200
Vantive Corp. www.vantive.com	Santa Clara	CA	Client/server application suite for customer service, sales and support	John Luongo	258
Vastera, Inc. (Formerly Export Software) www.vastera.com	Chantilly	VA	Software for import/export management	Arjun Rishi	85
VDOnet Corp. www.vdo.net	Palo Alto	CA	Server that allows delivery of real-time motion video clips over the Internet	Marty Falaro	90
VeriSign, Inc. www.verisign.com	Mountain View	CA	Digital ID's for identifying parties in an electronic transaction	Stratton Sclavos	130
Visigenic Software, Inc. www.visigenic.com	San Mateo	CA	Object request broker, database middleware software development	Roger Sippl	175
Wayfarer Communications, Inc. www.wayfarer.com	Mountain View	CA	Internet/intranet push technology for businesses	John Laing	37
WebFlow Corp. www.webflow.com	Santa Clara	CA	Web-based project collaboration software	Stephen Tolchin	40
Webline Communications, Inc. www.webline.com	Burlington	MA	Java-based call center software to blend telephone and Web customer interaction	Dan Keshian	26
Whistle Communications Corp. www.whistle.com	Foster City	CA	9-inch high box that provides access to Internet and internal E-mail	John Hamm	75
Worldtalk Corp. www.worldtalk.com	Santa Clara	CA	Directory-based software to deploy and extend corporate intranets with E-mail, groupware and security service	Bernard Harguidegui	102
XCD, Inc. www.xcd.com	Tustin	CA	Connects up to four printers to 100BaseT Ethernet networks	Jim Okubo	25
Xylan Corp. www.xylan.com	Calabasas	CA	High-speed local area and ATM switch	Steve Kim	535
Yahoo Corp. www.yahoo.com	Santa Clara	CA	Web search engine	Tim Koogle	225

Key Funding Sources *	Year Founded	Public/Private
Adobe Systems, Inc.; Compaq Computer Corp.; CUC International; Knight-Ridder; Softbank; others; 36M (second round)	1992	Private
Oak Investment Partners; Accel Partners; IVP; April 1996 IPO: $20.9M	1990	Public
April 1995 IPO: $32M	1990	Public
March 1996 IPO: $36M	1991	Public
Transcosmos/Encompass; Technology Crossover Ventures; Merrill Lynch; Velocity Capital; CSK Corp.; $17.9M (third round)	1994	Private
Norwest Venture Capital: $3.5M. Also self-funded.	1993	Private
Warburg, Pincus Ventures; private funding and others; $40M	1995	Private
May 1997 IPO: $33M	1990	Private
February 1996 IPO: $45M	1992	Public
March 1995 IPO: $41M	1990	Public
El Dorado Ventures; Crosspoint Venture Partners; Greylock; U.S. Venture Partners; $6.5M (latest round)	1995	Private
November 1995 IPO: $20M	1991	Public
June 1996 IPO: $33.1M	1993	Public
Blue Rock Capital, L.P.; Delaware and Zesiger Capital Group; University of Massachusetts at Amherst; $3.5M	1996	Private
Private funding	1993	Private
Star Venture Partners; Interwest Partners; Sequoia Capital; Accel Partners: $10M	1992	Private
John Landry; Warburg, Pincus	1994	Private
Self-funded	1990	Private
Self-funded	1995	Private
North Bridge Venture Partners; Oak Investment Partners; $3.2M	1993	Private
Softbank Ventures; Crosspoint Venture Partners; The Cutler Group; Strategic Partners; $34.3M	1996	Private
August 1995 IPO: $24M	1990	Public
Battery Ventures: $3M	1992	Private
Microsoft Corp.; US West Media Group; Nynex; Battery Ventures	1995	Private
Ameritech; AT&T; Bessemer Venture Partners; Cisco; Comcast; Intuit; KPCB; Merrill Lynch; Microsoft; Visa International; others	1995	Private
August 1996 IPO: $15.8M	1993	Public
Sequoia Capital; Hummer Winblad; Robertson & Stephens Venture Partner Co.; Bay Partners; Stanford University	1994	Private
Bessemer Venture Partners; Canaan Partners; Draper-Fisher Associates; Vertex Management; others; $15M	1995	Private
Information Technology Ventures; Advent International; Draper Fisher Jurvetson; Advanced Technology Ventures; $8.4M	1996	Private
IVP; Mayfield Fund; $7M (latest round)	1995	Private
April 1996 IPO: $14M	1992	Public
Privately funded	1992	Private
March 1996 IPO: $109M	1993	Public
April 1996 IPO: $33.8M	1995	Public

* Dollar amounts are totals for all sources listed, unless they directly follow a source.
KPCB = Kleiner Perkins Caufield & Byers Java Fund. IVP = Institutional Venture Partners.

Muscle matters to Network Appliance

David Hitz

To one Silicon Valley start-up, brawn — not brains — is the key to success. Five-year-old Network Appliance, Inc., whose revenue doubled in the past year to almost $100 million, is not trying to razzle-dazzle the marketplace through technical innovation but by filling an urgent, if humdrum, market need: fast access to network data.

The Santa Clara, Calif., company is selling a series of multiprotocol servers — dubbed NetApp Filers — that attach directly to a network and provide the muscle for quickly accessing files from the ever-growing repository of corporate data. In contrast to general-purpose servers from Sun Microsystems, Inc. and Microsoft Corp., the company's single-purpose servers offer simplicity and top performance, not complexity or compute-intensive functions, according to Phil Rueppel, a research analyst with Alex. Brown & Sons, Inc.

"Like a toaster in the kitchen, this appliance does one thing, and one thing only," says 34-year-old David Hitz, a cofounder of the company and its chief technical officer, noting that it can take days or weeks to configure a full-function Unix or NT server. "It gives fast, reliable access to files on the network. That's it."

Thus far, analysts and venture capital firms are pleased with the marketing, management and financial growth of the company, which went public in November 1995 and now employs 300 people.

Though the product offering is simple, sophisticated marketing savvy, controlled European expansion and a smart management team led by CEO Dan Warmenhoven — a former IBM and Hewlett-Packard Co. senior executive — have propelled revenue from $15 million in 1995 to $94 million in the 1997 fiscal year that ended April 30, observers say. The company's profits are 10% to 15%. "They've performed well beyond our expectations," says Don Valentine, a general partner at Sequoia Capital, of Menlo Park., Calif., one of four venture capital firms that invested in the company. "They've been able to grow as rapidly as possible while maintaining a strong balance sheet and a positive cash flow. They're a relatively small company in a gigantic market, but they have optimized for a narrow range of customers."

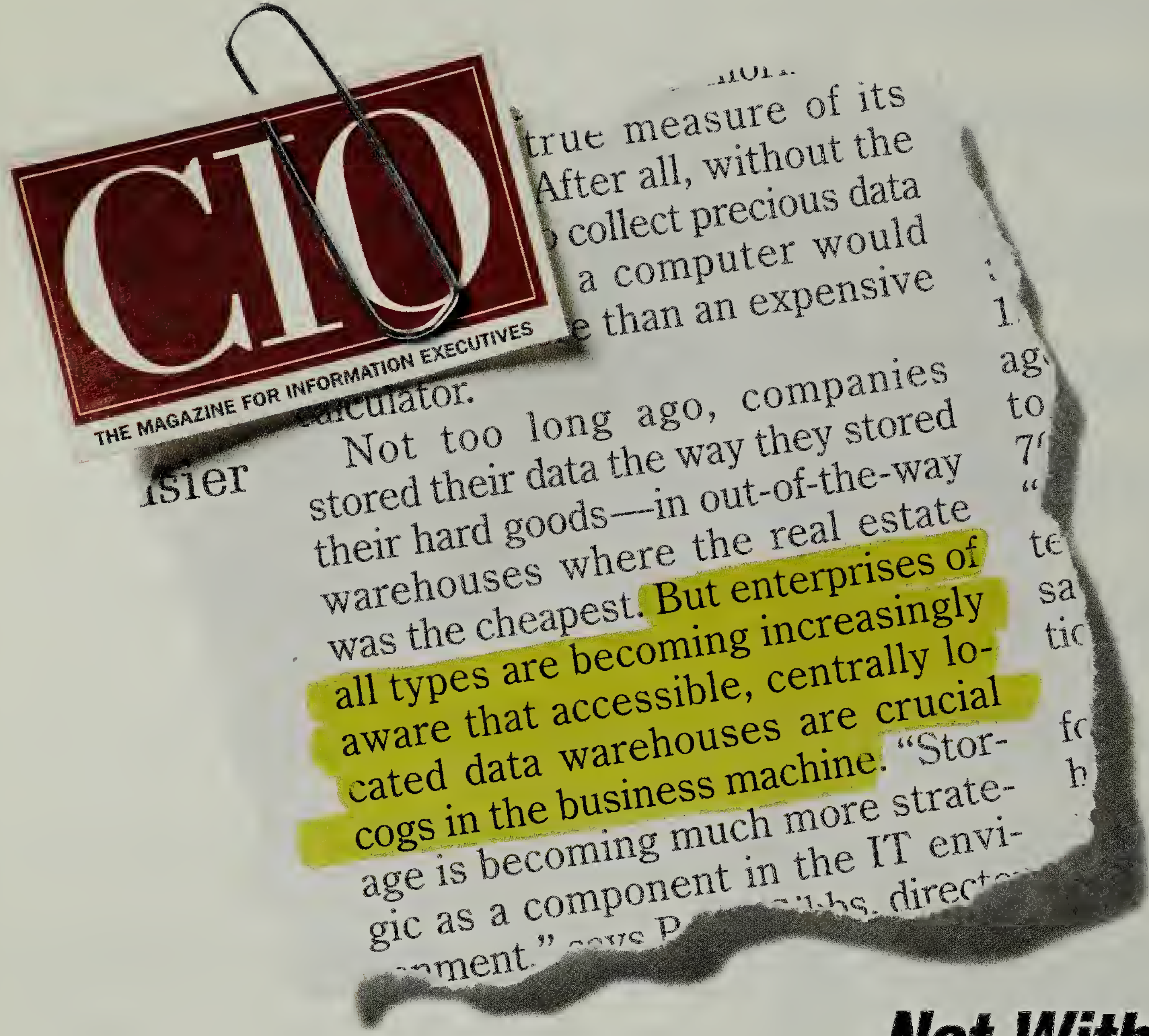
> **"Like a toaster in the kitchen, this appliance does one thing, and one thing only."**
>
> **— David Hitz, cofounder, Network Appliance**

The company's support for multiple protocols — Windows NT and HTTP — in addition to its flagship Unix support is a defining strategy that put Network Appliance on the map, observers say. To its credit, Network Appliance engendered the technical help of Microsoft to engineer the CFIS protocol into its NetApp Filer.

Analyst Rueppel notes, however, that the company needs a direct sales force and more partnerships to fuel growth and withstand competition from companies such as Auepex, Inc. and Invincible Technologies Corp.

Network Appliance is poised for continued growth, and its acquisition of Internet MiddleWare Corp. and its Web proxy caching software — as well as plans to increase its investment in the Internet — is a good sign, observers say. Investors hinted that the company will likely incorporate more Internet protocols as they emerge. "There are some interesting things coming down the pike in this area," Sequoia's Valentine says.

By Paula Rooney, a freelance writer in Boston.



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